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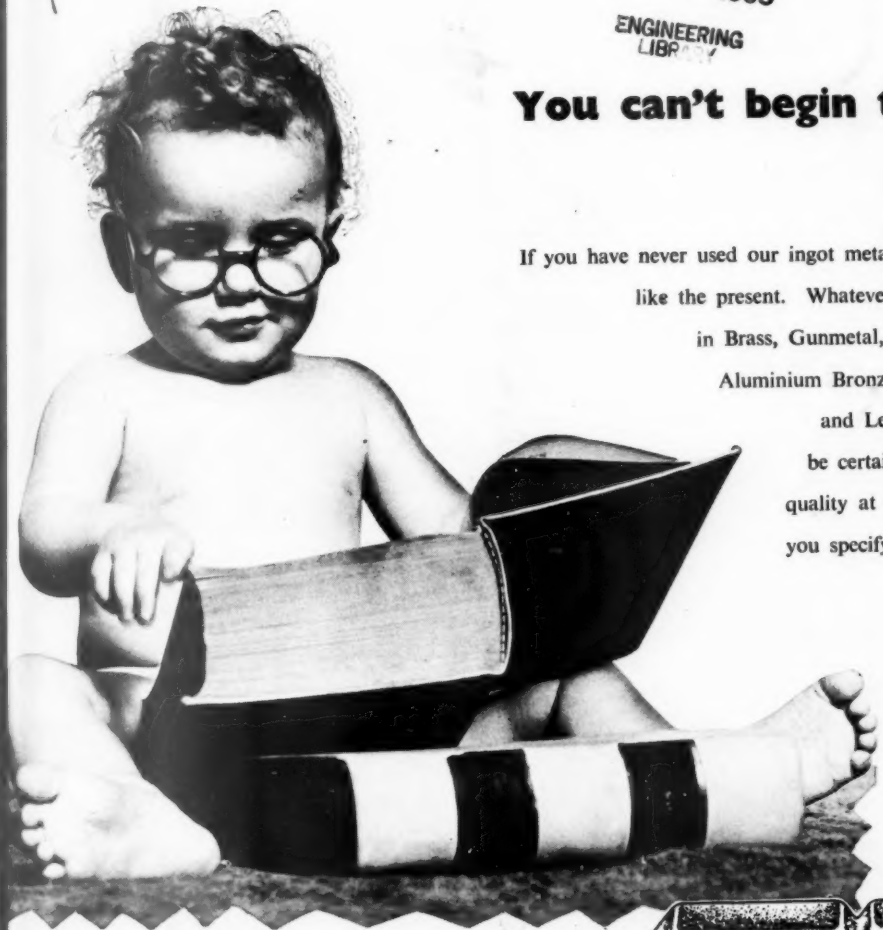

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Belgian International Foundry Congress

The 25th International Foundry Congress is to be held in Brussels and Liège from September 29 to October 3, under the high patronage of Baudouin, King of the Belgians. When it was first announced, there were doubts as to the ability of the city of Liège to house all those who wished to participate. However, conditions are such that there is ample hotel accommodation available. The British participation will be of the order of 75, and this is important as a very long experience has shown that social contacts rank high in the benefits to be derived from the time spent at congresses. When friendships have first been formed, the exchange of technical information is facilitated to the extent of being dynamic. For most visitors, the trip to see the Brussels Exhibition will be a major occasion and they will, like so many others, take pride in the pavilions organized by the British. This is not an insular view, but one currently expressed by Belgian Nationals themselves, as they deem them to be the best of all.

There has been much criticism of the fact that on this occasion an overall inclusive fee has been charged for participation in the Congress. We deem this to be a wise step, for it gives a freedom of last-minute choice of, say, a works visit. In past congresses, it has often been found that Mr. X from Ruritania wishes to change his mind on arrival at congress headquarters and visit the works of Smith for which the transport costs are 7s. 6d. whereas he had booked for the trip to Jones company at 5s. The change of ticket having been effected, he offers a 10-ducat Ruritanian note to pay the difference. The waste of time and the incidence of book-keeping has been greatly reduced by instituting an overall charge and, in practice, much elasticity has been introduced.

We have had the privilege of visiting quite a few Belgian works and whilst they are not so intensively mechanized as, say, Ford's, they do reflect excellent foundry practice—some on a large scale—with exceptionally high productivity. Most have several sections and in these can be seen activities closely approximating those currently practised at home. It is here that most is to be learnt and the Channel does somehow or other make managers attach more—or sometimes less—importance to various phases of manufacture than is the case on the opposite side. Ease of sand handling in a small brass foundry, the control of furnace conditions using a periscope, and the removal of refuse from the foundry are all matters presenting a novel approach. We believe that participation in the Belgian Congress can be really worth while, viewed alike from the social, technical or works-inspection aspects.

German Foundrymen's Technical Association

The annual general meeting of the *Verein Deutsche Giessereifachleute* (German Foundrymen's Technical Association) is to be held on September 19 at Düsseldorf; Dr. Schwietzke is to preside. The following papers have been scheduled to be presented:—

(1) "Influence of Hydrogen-gas Scavenging on the Properties of Cast Iron," by Dr. P. von der Forst, Duisburg. (2) "Influence of the Grain Distribution on the Service Performance of Foundry Sands," by Dr. Franz Hofmann, Schaffhausen. (3) "Influence of the Activation of Clay-bonded Moulding-sands on the Green-strength," by Dipl.-Ing. D. Boenisch, Aachen. (4) "Progress in the Field of CO_2-Practice," by Dr.-Ing. W. Schumacher, Wengern. (5) "Pyrometric Measurements on Hot-blast Cupolas," by Prof. Dr.-Ing. K. Roesch and Ing. H. Huber, Remscheid. (6) "Semi-mechanized Cement-sand Moulding Shop with Flow Sequence of Operations," by Ing. W. Hoeg, Kiel. (7) Relationship between Mechanical Properties of the Casting Itself and the Separately-cast Test-bar," by Dipl.-Ing. F. Iske and Prof. Dr.-Ing. W. Patterson, Aachen. (8) "Gas-absorption from the Air and from Combustion Gases during the Melting of Light Alloys," by C. Mascré and A. Lefebvre (to be read by Mr. G. Blanc), from the *Centre Technique des Industries de la Fonderie*. (8) "Melting of Copper-base Alloys with Special Reference to Cast Copper of Maximum Conductivity," by Dipl.-Ing. E. Brunhuber, Munich. (10) "Flowability and Mould-filling Capacity of Metals," by Dipl.-Ing. R. Kümmerle, Stuttgart, and finally a colour film will be shown entitled "Aluminium—the Portrait of a Metal," produced by *Aluminiumzentrale*.

Details of this meeting are available from Mr. P. N. Schneider, 70, Sohnstrasse, Düsseldorf, Germany.

Cranes and their drivers

Steelworks cranes will be the subject of the 37th meeting of the Iron and Steel Engineers' Group of the Iron and Steel Institute, which is being held in Chester from October 14 to 16. The first day's discussions will centre round the crane in relation to the man who operates it. The papers to be discussed will include a report on crane safety in the iron and steel industry, prepared by the Accident Prevention Committee of the British Iron and Steel Federation; two papers on the ergonomic aspects of crane design from the British Iron and Steel Research Association; and two more general papers, one on engineering psychology, and the other on human temperature regulation, from the Medical Research Council.

In the second technical session, the steelworks crane will be discussed from an engineering viewpoint. The papers to be presented, both from BISRA, will be devoted to structural design of cranes and to a plain frame method of analysis for lattice girders. In addition to the technical meetings, there will be a visit on October 15 to the Irlam Works of the Lancashire Steel Manufacturing Company, Limited, followed by a dinner in Chester by invitation of the company. Further details may be obtained from the secretary, the Iron and Steel Institute, 4, Grosvenor Gardens, London, S.W.1.

A PROFIT-SHARING BONUS of Rs.10,815,000 is to be paid to workers of the Tata Iron & Steel Company, Limited. This is Rs. 140,000 more than last year (one rupee is worth about 1s. 6d.).

British Standards Institution

Aluminium rainwater goods (B.S.2997:1958)

British Standards Institution announces the publication of a new Standard which deals with a large range of aluminium rainwater goods. Its 42 pages contain requirements (suitably revised) previously spread over two British Standards that are now withdrawn: B.S.1430 and B.S.1543. Thus it relates to cast, extruded and wrought gutters, pipes, fittings and fixing brackets of both rectangular and round section.

The foreword explains that B.S.2997 was prepared at the request of the aluminium industry to ensure that the general features of the goods should be "compatible with those of other materials for which British Standards exist, and to ensure the use of suitable alloys." Accordingly, the materials from which the components are to be manufactured are now specified by reference to the appropriate British Standard alloys.

Variations have been introduced in (i) methods of jointing the pipes (ii) the shape of sockets (iii) the appearance of some of the hopper heads; they were made to ensure that finished work has the "streamlined" appearance so characteristic of modern architectural design. It is stressed that the sockets of the pipes are not intended for heavy caulking and, therefore, are not suitable for internal installations.

Copies of this Standard may be obtained from the British Standards Institution, sales branch, 2, Park Street, London, W.1; price 8s. 6d. (Postage extra to non-subscribers).

An Unusual Convention

The material handling group of the Institution of Production Engineers announces that a convention is to be held centred in the Hotel Metropole, Brighton, from October 13 to 15, whereat groups will visit various types of works, study and discuss the problems of materials handling encountered and finally enunciate practical suggestions for its improvement. A variety of works are to be visited and included in the list are manufacturers of beer, castings, clothing, furniture, office machinery, etc. The convention is open to non-members of the Institution and details of this rather unusual meeting are to be had by writing to the secretary, Materials Handling Convention, 10, Chesterfield Street, London, W.1.

Vitreous Enamelling Courses

The following courses in vitreous enamelling are being offered at the College of Ceramics, North Staffordshire Technical College, Stoke-on-Trent, commencing September 22. (1) A full-time course, leading to the manager's diploma, involving six months study at the College and six months on a works in each year; subjects include vitreous enamelling, metallurgy, engineering, chemistry and management. (2) Part-time course intended for those who can only be released from work on two half-days each week, and (3) full-time course for a diploma in ceramics. All the courses are of three years duration, and further details may be obtained from the Head of the Department at the address quoted.

THE EXECUTIVE OFFICES of Kelvin & Hughes, Limited, were transferred on August 25 from 2, Caxton Street, London, S.W.1, to new premises at Empire Way, Wembley, Middlesex (Telephone: WEMBLEY 8888).

Progress Report :

Further Developments at the Derby Foundry of International Combustion, Limited

The installation of a new mains-frequency furnace at the foundry of International Combustion, Limited, at Derby has already been described in the JOURNAL.* *The first part of the following article is therefore of the nature of a operational report on this piece of plant. In the earlier feature on developments at the Derby works it was pointed out that the process of improvement in the foundry was a continuous one, and that further important projects were in the offing. The second part of what follows gives an account of one of these which has now materialized—the cleaning of castings by the "Hydroblast" system.*

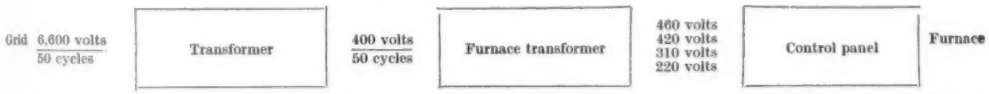
MAINS-FREQUENCY FURNACE

Development of the foundry of International Combustion, Limited, at Derby had reached a stage where s.-g. iron production was urgently required and alloy cast irons were not a remote possibility. Consequently, after consultation with Birlec, Limited, it was arranged to visit several plants in Germany where mains-frequency furnaces could be inspected under production conditions. Here the simplicity of operation of these furnaces and the successful way in which they were being used was immediately apparent.

Following this visit and after further discussions to determine the company's exact requirements, an order was placed for a five-ton 300 k.w. mains-frequency furnace, which incidentally was the first to be installed in the United Kingdom, apart from a small experimental unit of 18-cwt. capacity, manufactured for development work at Birlec, Limited.

The diagram shown in Table 1 below gives a clear picture of the simplicity of the electrical supply to the furnace.

TABLE 1.—*Electrical Suppl to a Five-ton Mains-frequency Furnace.*



On the two higher voltage ranges a choice of tapping is provided so that maximum loading can be obtained in individual conditions. The furnace coil is in two sections, each section being split up into three circuits to ensure adequate cooling water over all sections. The cooling water is circulated at the rate of 20 galls. per min. and the efficiency of this cooling system can be judged from the fact that the outlet water temperature is only 70 deg. F. when five tons of metals is being held at 1,550 deg. C.

The main body of the furnace is rammed with a proprietary dry acid lining. The top 9 in. is composed of Durax No. 2. The amounts of material normally used are:—Main body of lining —30 cwt.; top ring (Durax No. 2)—5 cwt.; total—35 cwt. After the acid lining comprising the base has been tamped down, a mild-steel former is placed in position and the remaining lining material rammed well into position. This former is not removed when ramming is complete, but is melted out slowly during the first heat after the lining has been well fritted.

Operation

When the molten bath of metal is ready, the furnace can be tilted through 97 deg., thus ensuring complete drainage. After 97 deg. of tilt automatic cut-outs come into operation and prevent the furnace being tilted further. Tilting is by hydraulic rams driven by electric motor and in case of complete power failure, a supplementary petrol emergency motor (Fig. 1) is provided. The furnace is situated at the end of the main bay of the foundry and one of two hot-blast cupolas is used for melting down the base mix. The metal tapped from the cupola is transported by ladle down the foundry and poured into the mains-frequency furnace, the total amount being recorded on the log sheet.

This base metal is now superheated and a sample withdrawn for analysis (Fig. 2) and on receipt of the analysis, the bath of metal is adjusted for chemical compostion and the final temperature is obtained ready for the inoculation with magnesium of the subsequent production of s.-g. iron. A great advantage of the mains-frequency type of melting unit is that of the turbulence of the metal which greatly facilitates alloy additions and carburization. Granulated electrode-graphite carburizing material, if added correctly, is immediately drawn into the bath of metal by the turbulence and held there until solution occurs, thereby making possible the calculation of yields within very close limits.

The rate of superheating naturally depends upon the design of the furnace and also its rating, but in the case of the above-mentioned furnace, when 90 cwt. of metal is being superheated, the temperature can be raised at an average rate of 100 deg. C. per hr. This rate of increase in

* See FOUNDRY TRADE JOURNAL, April 11, 1957. An earlier article (January 5, 1956) described cupola developments.

FIG. 1.—*Petrol-driven motor which in an emergency (such as a power failure) operates the hydraulic rams for tilting the furnace.*

temperature falls off a little as the temperature rises due to losses by radiation and convection, but 1,550 deg. C. is reached quite easily and 1,610 deg. C. has been attained without effort. Power consumption during superheating can be assessed from the following figures:—A bath of 90 cwt. of metal was raised from 1,420 deg. C. to 1,490 deg. C. in half an hour, and from 1,490 deg. C. to 1,555 deg. C. in a further half hour using 150 k.w. in each case. This gives a figure of 70.5 kw.h. per ton for each 100 deg. C.

Overnight holding of metal is relatively simple and needs the minimum of supervision, to ensure balance of the power factor and to check the tendency for the metal to skull over. When a bath of metal is to remain in the furnace overnight the transformer tapping is reduced to 220 volts (tap 4), when the metal temperature falls at about 5 deg. C. per hr. down to 1,280 deg. C. This temperature is then maintained by the power input with it in the order of 70 to 80 kw.

Metal can be held in the furnace quite easily under these conditions from 5.00 p.m. one day to 8.00 a.m. the following day, a total time of 15 hrs. with the consumption of 1,420 kw.h. This figure can be broken down to represent 94.5 units per hr. for 90 cwt., or 21 units per hr. per ton. At present, this furnace is being used as a holding and superheating unit for spare shop metal and for the production of s.-g. iron (Fig. 3). The simplicity of operation coupled with the close control of temperature and chemical composition will undoubtedly lend itself to further applications as development work progresses in the foundry.

FIG. 2.—*Sampling metal held in the mains-frequency furnace.*

"HYDROBLAST" SYSTEM

With the primary object of still further improving the working conditions in the foundry, the decision was taken to reorganize the existing methods for the cleaning of medium and large castings. The manual method with its attendant clouds of dust polluting the atmosphere to the detriment of the health of the operatives, together with the waste of valuable floor space occupied by the knocked-out sand and the long and laborious time taken in producing finished castings, were factors which led to the decision.

Considerable thought was then given to the most economical way of eliminating the dust nuisance and increasing the production of clean finished castings. After considering all the facts related to the company's specific requirements, layout, etc., it was eventually decided to instal an hydraulic plant operating on the Hydroblast system. Several makes of this type of plant were inspected and studied under actual working conditions and it was finally decided that the externally-operated gun unit as manufactured by Pneulec, Limited, was the one most suited to the company's particular requirements.

In conjunction with this firm a comprehensive scheme complete with water-clarification plant

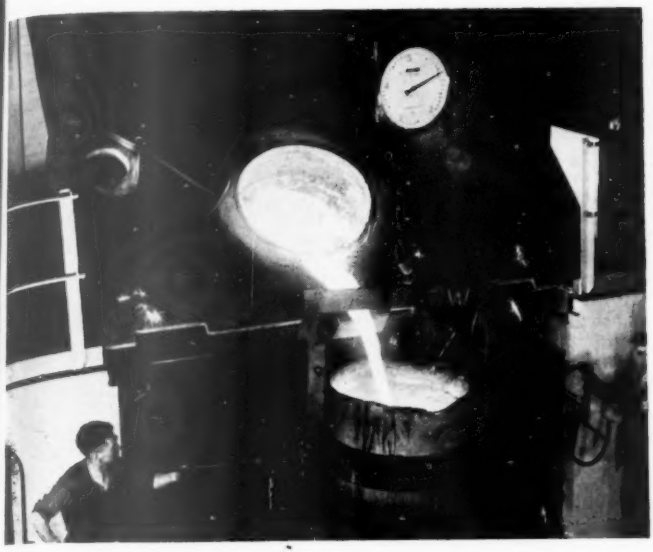


FIG. 3.—*Pouring metal from the mains-frequency furnace into a crane-suspended ladle. Note the use of a dial weigher.*

incorporating standard units of I.C., Limited, manufacture was prepared. The steelwork including the blast chamber, tanks, supporting structures also the classifier, thickener, "Hummer" screen and "Vacseal" pumps, which are standard products, were manufactured and erected by the International Combustion company, itself. The plant is capable of handling approximately 4½ tons of sand per hr.

The cleaning unit comprises an open-topped cleansing chamber approximately 19-ft. square, a total height of 15 ft., with a 13-ft. 6-in. door opening, a power-operated turntable located at floor level in the centre of chamber and an externally-operated high-pressure gun. The capacity of the gun is 35 galls. per min. at 0.80 tons per sq. in., it is mounted on a carriage inside the chamber and has horizontal and vertical electrically-controlled movements of 13 ft. and 6 ft. respectively, the gun also swivels on the carriage and is hydraulically controlled. The two control levers for remotely controlling these movements are fitted into a box located outside the chamber and traverse the length of chamber.

To permit the operator to observe and direct the water jet, observation windows with cleaning sprays are arranged along the length of the chamber, the operator moving along pushing the control box with him to the most convenient observation window to carry out his operations. The loaded bogie carrying the castings to be cleaned is pushed along the standard-gauge rail track on to the turntable, the chamber door is closed. The high-pressure jet is directed against the casting, the material removed is washed through a grided floor and flows down a sloping launder where it is discharged over a "Hummer" screen to remove the oversize material which is discharged into a refuse skip.

The underflow from the screen, consisting of sand, water and various other materials, passes into sump from which it is pumped by a Vacseal pump up to an I.C. classifier where the fines containing the deleterious material are separated from the sand, the latter being automatically discharged into the blast tank for use through the gun, the excess sand not required by the gun is overflowed into a dewatering tank from which it is discharged, then dried for re-use in the foundry.

The overflow from the classifier containing

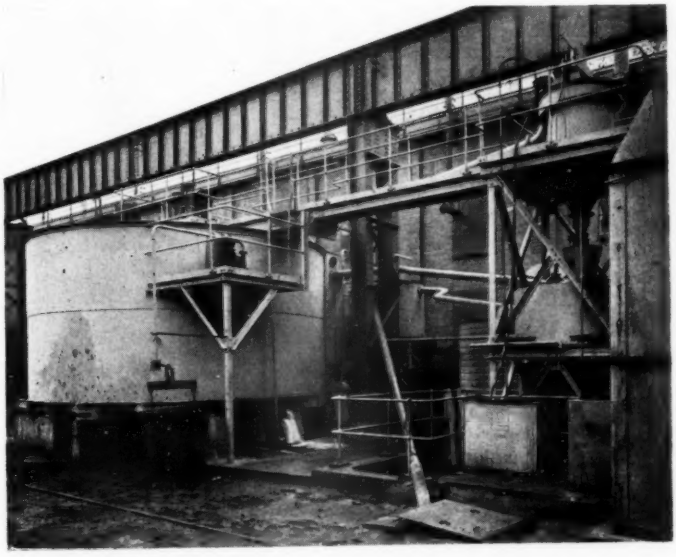


FIG. 4.—*Classifier and auxiliary equipment relating to the Hydroblast plant and installed along the outer wall of the Derby foundry.*

International Combustion, Limited

the fine material is dosed with a flocculating reagent at this point, and thence flows by gravity into a large-diameter thickening tank where the solids contained in the incoming slurry settle to the bottom and are automatically raked to the central discharge point by a power-operated raking mechanism, where it is pumped by means of a Vacseal pump either to a skip or direct to the refuse dump.

The clarified water overflows along a weir edge, extending around the whole circumference at the top of the thickening tank, into a launder from which it flows into a collecting tank which supplies the necessary diluting water to the sand-pump sump and the blast-sand tank. The booster pump, which operates at approximately 35 lb. per sq. in. supplying the necessary water for agitating the sand in the sand-blast tank, cleaning the chamber observation windows and releasing chokages in pipes and valves wherever necessary, draws its water from this source. The remaining clarified water not used for these purposes overflows into a surge tank from which the high-pressure ram pump feeding the gun takes its supply; the tank make-up water from the town's main which is a very small quantity is introduced into this tank.

The sand required for blasting purposes is taken from the sand-blast tank by the following means. As the high-pressure water reaches the gun it passes through Venturi nozzles creating a vacuum which sucks the sand through a feeder located near the bottom of the tank and into the high-pressure system at the gun. This mixture of sand and water thoroughly scours any material adhering to the castings.

The water system is a closed recirculating circuit, the only make-up water required being the losses in the refuse discharged from the thickener and that in the surplus sand returned to the foundry for re-use, this being an important matter when the cost of town's water is high and supplies are limited. The electrical-control panel for the various units is conveniently located behind the operator with push-button controls and coloured lights to indicate "motor running," etc., and independent push buttons for both high-pressure pump and turntable are mounted near to the operator giving maximum control with the minimum effort. The plant has just been put into commission and although there are a few minor adjustments to be made, results to date are reported to be highly satisfactory.

ESC Heaviest Mill Housings

The Grimesthorpe foundry of English Steel Corporation, Limited, Sheffield, has recently cast two 168-ton rolling-mill housings for the Davy United Engineering Company, Limited, for final delivery to the South Durham Steel Company, Limited. They are claimed to be the heaviest so far produced in Great Britain and are about four tons heavier than the previous largest mill-housings cast at Grimesthorpe last year. They required about 220 tons of liquid steel to cast each housing. The housings each had two feeder heads, 5-ft. dia., and additional electric furnace steel was used for counteracting shrinkage. About 900 hours in each case were spent on moulding and closing, the top parts of the moulds being made in two pieces, as they would otherwise be too large to handle. Each casting is 33-ft. long, 16-ft. wide and 6-ft. 6-in. thick over the gear end, and 4-ft. 9-in. thick over the feet end, whilst a cross-section of the legs measured 35 by 32½ in.

Shorter Order-book for Machine Tools

An unstable position has developed in the machine-tool industry, with some manufacturers claiming increased trade, while others report business less active; but it seems, on the whole, that the slight recovery which began to appear at about the end of April may have been sustained.

The industry's total deliveries are still exceeding the rate at which new orders are coming in, with the total order-book for May of this year standing at £67,105,000—against £68,610,000 in April, and £91,474,000 in May last year. Home orders during May totalled £4,190,000 and exports £1,131,000 (against £3,932,000 and £1,246,000, respectively, in April). Deliveries during the month amounted to £4,926,000 in the home market and £1,650,000 oversea, against £4,884,000 and £1,757,000).

Basic Materials Prices Fall Again

The Board of Trade's basic materials index, after rising in June for the first time since March, 1957, fell again in July. The decrease of 0.3 per cent., which offset the June increase, was largely due to lower raw wool prices, which, added to slight decreases in the prices of manganese and tungsten ore, lead, and zinc, more than offset increases in the price of raw rubber, copper, and hides and skins.

Due to the increase in price of some copper and brass items, rubber, and tin, the index numbers for materials used in the mechanical engineering and electrical machinery industry both rose by 0.2 per cent.

The index for all manufactured products, other than fuel, food, and tobacco, showed a slight fall of 0.1 per cent. Among commodities contributing to this decrease were general chemicals, drugs and pharmaceuticals, fertilizers, and cotton cloth.

Further Developments at Blackness Foundry

A proposal to declare "black" all plant and machinery at Blackness Engineering Works, Dundee, which are to close, has been made by Dundee district committee of the AEU. About 300 of the 500 men employed at the works have received notice. As reported in the JOURNAL last week, through their union the men have refused an offer by the firm to pay compensation to those with over five years' service on condition that they assist in the transfer of plant and machinery to their associated firm in Leeds. Mr. William Brown, district president, said the AEU resented the fact that the terms of the offer were unalterable. They had decided to call a meeting of all unions likely to be concerned, including the National Union of Railwaymen and the Transport & General Workers' Union, to consider a proposal to refuse to handle any plant scheduled to be removed to Leeds.

Casting Defects . . .

. . . their Possible Cause and Remedy*

By J. R. Park

It has been stated: "that despite all the technical control and investigation, some of the problems which are constantly met with in the foundry appear just as difficult of solution as they were in the old rule-of-thumb days." In the following article it is proposed to re-capitulate what a few of these problems are, their possible cause and to outline suggestions which have been made for their solution.

One of the most controversial subjects in the foundry trade is the cause and cure of the various defects which result in a casting being scrapped. Much time and money would be saved if it ever became possible to produce 100 per cent. good castings, but whether this ideal will ever be achieved is a question which it is impossible to answer. Certain it is that anything that can be done to eliminate scrap castings is a worthwhile endeavour. One of the greatest problems, especially in foundries which employ metallurgists who control what is known as the technical side of the foundry, such as metal melting, sand mixing, etc., is to obtain an unbiased opinion as to the cause of the various casting defects which occur. Unfortunately there is a tendency on the part of foundrymen to attribute all but the most obvious moulding faults to the metal or any other factor outside their control. The most satisfactory way out of this is to employ an experienced inspector to diagnose the reason for the defects. This he would do, after consultation with the foundryman and the metallurgist, and his verdict should be accepted.

Causes

Defects usually arise primarily from one of the following causes:—Metal, sand (including binders), moulding practice, patterns and casting design. These may be extended in more detail as follow:—

(*a*) *Function of the metal and metal melting*

Incorrect metal composition and bad melting practice, lack of fluidity due to composition, temperature and, according to some foundrymen, oxidized metal and oxide inclusions, casting temperature not suitable for the particular job, gas inclusions.

(*b*) *Function of the sand and other moulding materials*

Materials used for the mould or core may be of unsuitable composition, lacking in strength, insufficiently permeable to allow gases to escape, insufficiently refractory, too strong or too rigid to yield to the contraction of the cooling metal.

(*c*) *Function of moulding practice and everything else on the foundry floor*

Incorrect or varying ramming of sand by the moulder. Incorrect shape and faulty positioning of runners and feeders which may give rise to mould erosion, trapping of gas, quick cooling of metal resulting in cold-shuts and other faults. Feeders too small and too far away from heavy sections to feed these properly.

Moulding tackle such as boxes in bad repair, moulds crushed or knocked against whilst awaiting pouring, excessive rapping of pattern.

(*d*) *Function of pattern*

Errors in a pattern, either large or small, can cause, in the extreme, a totally wrong casting to be produced. More often, however, they result in dimensional inaccuracies in a casting, whilst such things as faulty jointing can give rise to wrong positioning of runners or feeders. Badly worn patterns should never be tolerated as they are a constant source of danger to the production of good castings.

(*e*) *Function of design*

Although this is to some extent outside the control of the foundry it comes into the limelight as a cause of faulty casting. The design may be such as to totally disregard some of the most elementary principles of the art of founding or be entirely unsuitable for the metal it is proposed to use. This is a matter which calls for close co-operation between the designer and the foundryman.

Further itemization may be made and the following is an attempt to achieve this.

Metal faults, not necessarily metallurgical, such as drawing and porosity including gas and other blowholes, cold-shuts and what is commonly known as oxidized metal. Mould and core faults such as crushing, straining, scabbing, cores lifting and breaking, run-outs, cross jointing, faulty closing and worn tackle generally. Sand and slag inclusions of various types. Bad work and faulty pouring, embracing such things as closing of moulds wrongly, short pours, interrupted pours, over-rapid or excessively-slow rate of pouring.

Metal Faults

Metal faults make a "touchy" subject for discussion in most foundries but there is no doubt that, compared with faults that can be attributed to moulding practice, the number of defects directly attributed to metal are relatively few.

Incorrect metal composition is not a very frequent cause of trouble, but cold-shuts and misruns are more common ones, although in a

* Reprinted from *Bradley's Magazine*. The Author, until he retired a few years ago, was chief metallurgist with Bradley & Foster, Limited and now acts for the company in a consultative capacity.

Casting Defects

properly controlled shop these should not be very frequent. It should be the aim of the furnace operator to supply the foundryman with hot, clean metal suitable for the work in hand.

If metal at the proper temperature is supplied to the caster and with a properly designed running system in the mould to allow the easiest filling of the mould, no trouble from cold shuts and misruns should arise. However, other things can cause these defects, the most frequent one being the foundryman or caster whose chief ambition in life appears to be to cast as many moulds as possible out of one ladle of metal, rather than pour some of it down on the floor, with the result that some of the metal is poured into castings at too low a temperature.

Another fault, especially in low-carbon irons, is the so-called gas holes or sub-cutaneous blowholes (Fig. 1) which may not be detected until the outer skin of the casting is machined off, and appear as porous areas immediately below the surface. The chief cause of this porosity or sub-cutaneous blowholes is the use of metal not sufficiently hot for its purpose. The result is that mould and other gases are trapped by the rapidly cooling skin of the casting, whereas if the metal had been hot enough these would have escaped before freezing commenced.

Drawing and shrinkage can possibly be listed under metal faults, in so much that they can be caused by the use of " dull " metal. However, they are more frequently caused by incorrect running and feeding and if the trouble is persistent these should be experimented with.

Care should be taken to see that the top of the feeder is kept open by covering it with a layer of dry sand. This latter precaution can work wonders. The use of exothermic feeder sleeves is, although somewhat expensive, very effective, their initial cost is offset by the fact that smaller feeders can be used. The use of denseners in heavy sections is another expedient to overcome drawing and shrinkage problems. Rod feeding is an expedient which has been used for many years but is looked upon with suspicion nowadays.

Mould and Core Faults

Scabbing is a common fault and in green-sand moulds may arise from a variety of causes such as sand too wet, mould rammed too hard, poor venting and incorrect gating. It can also be caused by excessive use of the swab for pattern drawing.

Particular care should be taken to vent freely projecting parts of the casting, and especially in large flat areas in heavy sections the rammer should not be allowed to come closer to the pattern than 1 to 1¼ in.

In dry-sand work, scabbing is more often than not due to insufficient or improper venting and care should be taken to use a sand having good permeability properties. It can also be due to improperly dried moulds.

Crushing is possibly more common in dry-sand than in green-sand moulds, the latter having more plasticity which enables it to adjust itself to possible misfits. All excess sand should be pared off the joints of the mould especially after withdrawing deep patterns.

Straining is usually caused by soft ramming or variable ramming by the moulder and its prevention is self-evident.

One point that must be stressed in both mould and coremaking, is that good moulds or cores cannot be made from poor-quality sand, and when once this principle is realized, one possible cause of moulding faults can be more or less eliminated. However, in these days of technical sand control, faults due mainly to sand quality, have greatly decreased.

Core breaking is probably the largest single cause of core faults and this is more often than not the fault of the core maker rather than the moulder. Cores should at all times be, if necessary, properly strengthened with correctly positioned core irons. Oil-sand cores have a tendency to absorb moisture if allowed to remain too long in contact with green-sand moulds and this can lead to softening and possibly yielding to pressure when in contact with molten metal. The cure is obvious. However, the use of synthetic resin binders has done much to improve the quality of the so-called oil-sand core, whilst the CO_2 Process appears to be making its mark both in moulding and coremaking.

Run-outs arise owing to the metal finding its way through the box joints. This can be caused by the lifting of the mould top owing to insufficient weighting or the failure of the moulder, especially in the case of large castings, to see that the box joints are properly plugged, and thus prevent run-outs by the metal creeping along the joints. Run-outs are an almost unforgivable fault, yet they are constantly occurring.

Cross Jointing and " Sided " Castings

Cross jointing is usually the result of slackness in moulding-box pins and holes due to excessive wear in these parts. Well-made boxes are essential, especially in machine moulding practice, and all parts subject to wear both on the machine, pattern-plate and box parts should be checked at regular intervals. The tendency nowadays is to fit some type of wear-resisting material to parts where excessive wear is liable to take place.

" Sided " castings resulting in uneven thickness in the wrong places are usually attributed to two faults: (1) faulty positioning of cores in the mould and (2) cores lifting. Faulty positioning of cores is considered by most people to be inexcusable except perhaps in the heaviest and probably the most intricate work. Much can be done by the management in seeing that the position of the cores is clearly marked on drawings and indicated on patterns. However, faulty positioning is usually due more to the moulder not using one of the accepted gauging methods for determining the metal sections round cores. The most widely used method is that of clay stumps and it appears to work quite satisfactorily. Core lifting is often due to insufficient prints being allowed on the pattern and is a case of false economy. Chaplets

are of great assistance in preventing the movement of cores but they must be used with discretion or they can be the cause of another set of faults. Tinned chaplets are the best to use and these not only ensure that the chaplets are clean but they will also fuse with the metal being cast. It is not required that they should melt, in fact it is a disadvantage if they do. However, in the case of certain castings such as those made in wear- and acid-resisting irons the use of chaplets is inadmissible and care should be taken that ample core prints are allowed for and that the cores should be as rigid as possible.

Blowholes, etc.

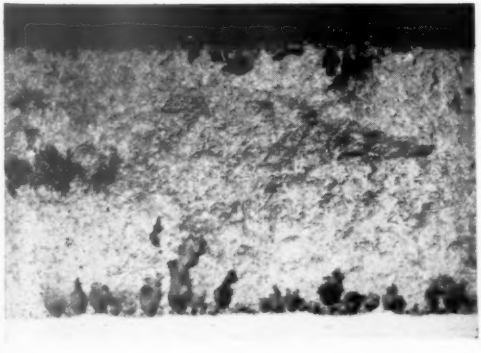
Blowholes usually have a smooth, shiny surface and can be caused in several ways. Gas coming from cores which are not properly dry or vented, metal getting into core vents and causing them to choke or, in the case of green-sand moulds, the use of sand with an excessive moisture content, rusty or damp chills and chaplets and too low a pouring temperature.

In some cases, blowholes are associated with small globules of metal and this is usually attributed to faulty pouring technique associated with splashing before pouring proper is commenced. The trouble is accentuated by the metal being on the cool side.

Sand holes or sand inclusions are a very prevalent cause of scrap castings. There are a wide variety of reasons for this defect. Loose sand in various parts of the mould and pouring basin, scabbing, crushing, vibration of various kinds causing sand to drop and the use of improper sand. One of the first principles of moulding should be to see that the mould cavity is free from any loose particles of sand. With good quality sand and good moulding practice there is really no excuse for this kind of fault.

There are various ways of preventing slag from entering the mould cavity. The first essential is to see that the metal in the ladle is well skimmed and that any slag not removed is prevented from leaving the ladle. The use of such devices as teapot spouts, skimmer bars, etc., is of great help.

FIG. 1.—*Section of a casting showing subcutaneous blowholes.*



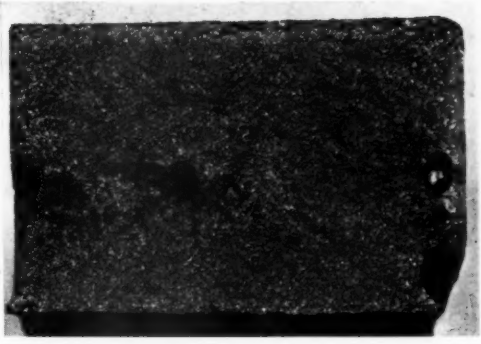


FIG. 2.—*Example of a casting section exhibiting blowholes and internal shrinkage.*

In the mould itself, such things as strainer cores and slag traps are helpful. In the actual pouring of the metal into the mould the use of removable plugs or perforated metal discs in the runner basin will hold the metal back until the basin is full, as it is usually the first metal which causes the trouble.

Cracking and Hot-tears

Cracking, especially of large castings, does occur and an examination of the crack will give some indication as to whether this has occurred when the casting was hot or cold. Cracking of castings before they have been removed from the mould can be avoided by easing of restricting cores, slowing down the rate of cooling of the casting if of reasonably even section, and in the case of castings of uneven section, accelerating the cooling of the thick sections or retarding the cooling rate of the thinner sections in order to achieve an even rate of cooling. Hot-tears usually occur on the inside corners of castings where the metal cools down at a slower rate than the remainder of the casting. The use of chills can help to prevent this.

"Bad Workmanship"

The phrase "bad workmanship" covers a multitude of sins, and in fact covers the type of defects which can be almost certainly attributed to the moulder or other foundry personnel not having taken reasonable care.

These include wrong closing of moulds, omission of cores, short pours, interrupted pours, knocking out castings too early or too late, and a whole host of little things which could be done to ensure good castings, but are not done either through lack of proper supervision or what is commonly called a "don't care" attitude. One of the first principles of good foundrywork is what is known as "good housekeeping," a place for everything and everything in its place, gangways kept clear, proper pattern and box-parts storage, ample room for each individual moulder to work and insistance on each working space being kept clean, adequate records especially of faults, etc. All this can be achieved only by the full co-operation of all foundry personnel, and if this is done it will go a long way to eliminating scrap castings.

Latest Foundry Statistics

The following is a detailed commentary on the Iron and Steel Board's announcement of iron castings production in the second quarter of 1958.

Total Output

Developing trading weaknesses in the building, steel and engineering industries have been reflected in the ironfounding industry and despite the continued firmness of the automobile industry, total castings production has fallen. In the second quarter of 1958 output at 887,000 tons compares with 945,000 tons in the second quarter of 1957, a reduction of 6 per cent. Details of sectional output for 1957/58 are given in Table 1.

TABLE 1.—*Production of Iron Castings, by Sections.*

Section (grey and malleable iron castings).	Second quarter, 1958.	Percentage change.	
		First quarter, 1958.	Second quarter, 1957.
	Tons.		
Automobile (including tractors)	144,200	− 6.6	+ 9.2
Engineering*	309,200	− 7.2	− 7.4
Building and domestic ..	122,000	− 8.4	−14.3
Pressure pipes† and fittings	127,000	−10.0	− 8.8
Ingot moulds‡	92,300	−14.0	−15.2
Railway equipment ..	92,500	+ 0.8	+ 5.0
Total	887,200	− 7.7	− 6.1

* Including machine-tool, textile machinery, electrical, shipbuilding, etc.
† Mainly gas and water.
‡ Mainly for the steel industry.

Although the production of castings for the automobile industry in the second quarter of 1958 was lower than that reached in the previous quarter it still constituted an all-time second-quarter record. The important engineering section continues to suffer from the effects of the nation's reduced level of investment in plant and machinery, and in the building section the reduced activity in the building industry itself has had a decidedly adverse effect on the iron foundries. In the steel industry, production has been and still is below 1957 levels and this has noticeably reduced the demand for ingot moulds. The production of castings for the railways continues to be sustained by the requirements of the railway modernization programme. Pressure-pipe production, however, was much reduced.

Raw Materials

The ironfounding industry's consumption of its principal raw materials is given in Table 2, and Table 3 gives the production of iron castings by districts.

TABLE 2.—*Pig-iron and Scrap Consumption by Foundries.*

	Second quarter, 1958.	Percentage change.	
		First quarter, 1958.	Second quarter, 1957.
	Tons.		
Pig-iron (including refined iron)	483,800	−11.9	−11.5
Scrap iron (about half is foundry circulating scrap)	688,600	− 4.7	− 0.3
Scrap steel	103,100	− 2.3	+ 9.0

Labour

The number employed in the ironfounding industry at the end of June, 1958, was 131,900: a reduction of three per cent. in the labour force from the level of 135,800 which obtained at the end of March, and a four per cent. reduction on the figure for the end of June which was returned at 137,800.

TABLE 3.—*Production of Iron Castings, by District.*

District.	Iron castings (tons).	
	Second quarter, 1957.	Second quarter, 1958.
Northern	96,510	89,050
North-West	103,460	96,000
Yorkshire	106,860	98,830
East Midlands	189,470	174,300
West Midlands	188,390	188,550
Eastern and Southern Counties ..	94,370	93,480
Scotland and Northern Ireland ..	105,580	88,100
Wales and Monmouthshire	59,820	58,900
Total	944,460	887,210

Rolling-stock for London Transport

Biggest single order for Underground railway rolling-stock to be placed by the London Passenger Transport Board since the war is to be shared among 13 companies. The order is for 532 high-capacity passenger carriages for completely replacing existing stock on the Piccadilly Line, and is estimated to be worth about £10,000,000.

The contract for the cars alone, worth £5,500,000, goes to the Metropolitan-Cammell Carriage & Wagon Company, Limited, while the General Electric Company, Limited, receives a £1,250,000 order for 1,200 traction motors. Other companies to share include the British Thomson-Houston Company, Limited (traction control and auxiliary equipment); the Westinghouse Brake & Signal Company, Limited (brakes); the Metropolitan-Vickers Electrical Company, Limited (motor generators); G. D. Peters & Company, Limited (door equipment); Associated Equipment Company, Limited (automatic coupling equipment); Hoffmann Manufacturing Company, Limited (roller bearing axle boxes and suspension bearings).

A further order to be placed shortly will be for 12 prototype high-capacity motor carriages for the Central Line; it will be worth about £45,000. These carriages will be used with 12 rebuilt trailer (non-motor) carriages to make up three test trains of eight cars each. After trials have been successfully completed, it is intended to renew the whole of the Central Line stock with trains made up of the new motor-cars and rebuilt trailers in equal numbers, thus speeding up relief for this at present congested line by reducing the number of completely new cars to be built.

These new contracts follow those placed last January for 248 new passenger cars for the Metropolitan Line, worth nearly £5,500,000, and for 13 new carriages, worth £250,000, to enable the Circle Line trains to be lengthened from five cars to six cars each.

Altogether, orders for Underground rolling-stock totalling 805 cars and worth £16,000,000 have been placed or are pending.

THE decision of Stewarts and Lloyds, Limited, tube manufacturers, to invest £10,000,000 in their works was praised on August 21, at Coatbridge, Lanarkshire, by Lord Strathclyde, Minister of State for Scotland, during a tour of industrial concerns in the areas. He said this decision showed their confidence in the future of the industry and added that he had also been much impressed by the degree of mechanization reached at the company's Coatbridge works.

Visit to . . . . . .

William Aske & Company, Limited

Continuing the series of visits paid to works of suppliers of equipment and materials for the foundry industry, the writer recently inspected the Halifax works of Wm. Aske & Company, Limited, suppliers of core-bonding materials. A particular objective was to see the newly-converted Beck Works, where much special plant has been installed for preparing binders for use in CO_2 foundry practice. A major aim of the following account is thus to keep founders in touch with what the supply side is doing to service the foundry industry. A feeling has been expressed in many quarters that the ties between suppliers experimenting with new equipment and products, and the foundrymen who will use them, should be strengthened. It is certain that much research work on the part of the supply industry goes unheralded and unsung, and yet it operates in the vital cause of keeping founders in the van of world progress.

Wm. Aske & Company claim to be the largest manufacturers of proprietary silicate corebinders in the country and the first and only company to put in a specialized CO_2-binder plant. As one reason behind this new installation, which is a project of some magnitude installed in the Beck Works, Mr. W. E. Aske, the managing director, mentions the fact that bulk buying of materials (sugar for example), permits economy in manufacturing and enables large operators to pass on a relatively low price to the customer. Automation in the Beck Works has been applied to the limit, having in mind the need for some flexibility. From the plant, three main types of CO_2 binder can be produced, according to whether price or quality is the major requirement. In it, the three men employed can prepare in one hour the same amount of material that five men could previously accomplish in one day, working with the old plant.

General Layout

Basically, CO_2 binders are compounded from raw liquid sodium silicate, and initially, it was decided to carry the silicate storage facilities and machinery on a network of steel built up from the ground floor of the building. Provision was thus made to store in tanks up to 200 tons of raw silicate, delivered hot to the site in tankers. (If the raw silicate is delivered too cold, it becomes too viscous to handle and measure.) The building procedure outlined necessitated 15 ft. of concrete foundations for the main structure; a total floor area of 3,616 sq. ft. being used on the various floors of the Beck Works for CO_2-binder preparation.

Before proceeding with the detailed description of the plant, it is interesting to record the use of coloured paints to indicate the purpose of structural work, plant and piping, *i.e.*, green for building steelwork, red for plant-supporting steelwork, light green for silicate containers and piping, blue for solution additions, orange for the "little something the others haven't got" and pink for storage equipment.

Process and Plant

The Beck plant carries out CO_2-binder preparation as shown in the process diagram reproduced in Fig. 1. Production of other of the firm's proprietary materials for the CO_2 Process is also undertaken here. The disposition of the plant (Figs. 2 to 4) on the three floors is arranged as follows:

Floor Level

At floor level, the concentrated sodium silicate is taken in at two points through 4-in. piping, falling 10-in. towards the steam-jacketed pump. The pipes are lagged and are pre-heated before delivery by a feed of "live" steam. Hot water is also supplied to these pipes to facilitate flushing out after use. Electronic control prevents any likelihood of over-filling the two 100-ton storage tanks by cutting out the pump and lighting a red danger signal.

Heat is provided by a small gas-fired boiler, feeding steam through two coils which are thermostatically controlled. The boiler is calculated to be the most economical size for the job and it burns 180 cub. ft. per hr., giving a 24-hr. service for 3s. 4d. per ton on a 60-ton throughput. Water feed is by mercury-switch-operated pump and in the event of breakdown, gas supply is shut off and a warning bell rung.

Also on the ground floor are the drum-filling points supplied from a holding hopper. Drums are filled three every 2½ minutes—with the institution of electronic control—and a track system is in use for the conveyance of both full and empty drums. The hopper is fed at this level from the emulsifiers, the level of which is also electronically controlled. A system of light signals keep the worker here informed as to the stage the process has reached and a timing device ensures a correct mixing period before he is given the all-clear to empty the contents into his hopper. The master control-panel embodies all the power control for the plant within the building. Once work starts for the day, the machinery is never closed down.

William Aske & Company, Limited

Landing Level

The basic silicate is fed to the emulsifiers through an electric pre-set batch meter. All pipes conveying silicate are electro-thermally wound, thermostatically controlled, lagged and fed with live steam and hot water. Solids fed into the pre-mixers from above are brought into solution, again with batch-meter control, and passed to the emulsifiers by an automatically-timed pump. Once again, there is a light-signal panel to provide process information to and from the workers at floor level.

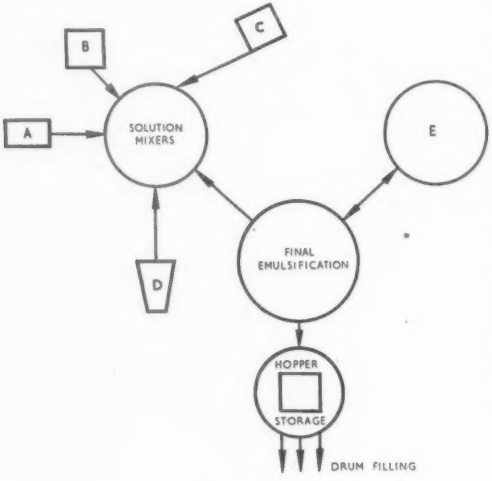


FIG. 1.—*Diagram illustrating the flow processes involved in CO_2-binder production at William Aske's.*

Key: At A, the chemical conversion takes place of a green-strength and breakdown agent; at B, a special breakdown agent is acid treated—on a laboratory scale; at C, a bench-life agent is heat processed and filtered; at D, the bench-life and (sugar) breakdown agent solids are fed in, and at E, the highest-available solids content silicate (heat controlled) is fed in.

First-floor Level

Solid materials are fed from first-floor level to the solution mixers on the landing floor and a pre-mixed compound (as shown previously on the flow-line diagram, Fig. 1) is measured and fed in together with the main breakdown chemical. Provision has been made for the solids, now fed by hand, soon to be automatically weighed and fed into the mixers. Various trapdoors give access to feeding chutes leading to other mixing machinery sited below. Handling equipment for bringing in raw materials is also sited here.

The whole of the plant is controlled from a panel situated at ground-floor level and normal operation is cycle controlled; 11 min. is required for charging each of the two mixers leading to the emulsifier, a 4-min. mixing period is allowed, and then it takes 9 min. to pump the emulsion to the storage hopper. Metering is automatic and "foolproof" and there is no possibility of overflows because the valves are operated in relays. It follows, however, that the plant must always be run at full production or be stopped. The present output is of the order of 100 tons per week of the CO_2 binder, but potential production can reach three drums or two tons every five minutes, that is, 24 tons per hour. For despatches of the binder to customers, a new loading bay is under construction and drum-handling facilities are being installed at the branch works at Boothtown; and the possibility of tanker deliveries to founders is envisaged in the near future for this type of material also.

Of the application of the CO_2 Process in foundries, the firm considers UK development may be reaching a peak, this being based on the experience of their representatives, each of whom carry equipment to demonstrate the Process. It has been found, for instance, that the CO_2 Process is not usually quicker for the mass production of small cores where the output per box is limited by the time required for gassing. It reaches its greatest advantage of application in jobbing or semi-jobbing work.

The new plant was designed and erection supervised by Mr. D. A. Carlin, general manager of William Aske & Company, Limited, the main contractors being listed at the end of this article. It certainly apears to be a most workmanlike installation and the numerous automatic controls of "Rolls-Royce" quality, while doubtless adding much to the first cost, are expected to pay their way in quite a short period as a result of increased accuracy in mixing, minimum supervision and elimination of waste.

Other Departments

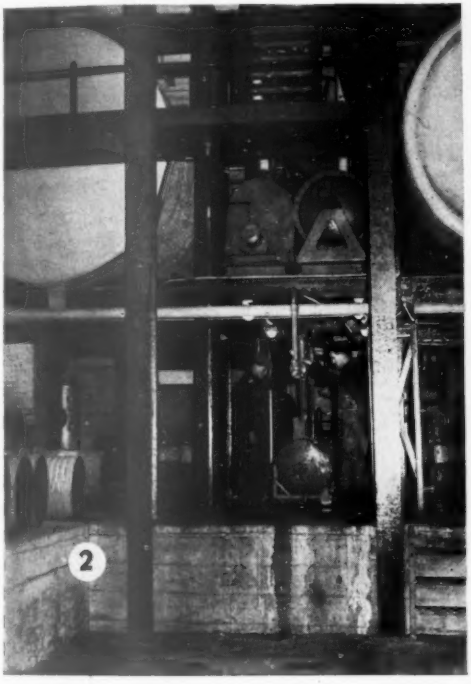
Before leaving Halifax, the writer made a brief tour of the rest of the works—Victoria Works—where other foundry binders are produced. This section also houses the firm's laboratories and shops for experimental core production and testing. It was most illuminating to be shown some of the testing schedules for incoming raw materials. The routine checking of incoming oil supplies, for instance, may involve the chemists in no fewer than 20 determinations per sample, quite apart from service checks on the result of compounding this oil with other materials. As would be expected, the keeping of case-histories and batch records also forms an important part of the staff-work.

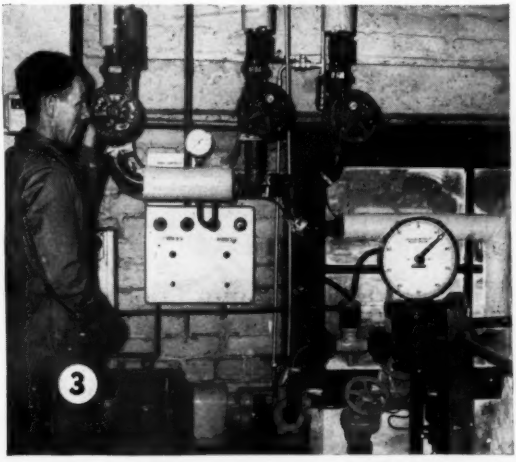
The total complement of employees of the firm is about 50, excluding drivers and staff at the firm's regional storage depots which are being established on a countrywide basis. The Victoria Works has itself been rebuilt to a considerable extent over the last year or so, following a disastrous fire in 1956. Needless to say precautions against repetition of the disaster have been re-doubled, and to the layman appear almost over-elaborate. Here, also, automatic metering devices, warning systems and a plethora of mixing controls are being installed.

FIG. 2.—*Two floors of the Beck Works; on the upper steelwork are the silicate storage-tanks and batch mixers; on the ground floor (raised to facilitate despatches by road lorry) is the drum-filling station.*

FIG. 3.—*Operator manipulating a valve at one of the metering and control points in the Beck Works.*

FIG. 4.—*Drums being filled with CO_2 binder; metering is automatic and movement of drums is arranged on wheeled bogies.*





Acknowledgment

In recording thanks to Mr. William E. Aske and his staff for the many facilities and courtesies accorded during the visit to the Halifax works, it would be remiss not to emphasize the point made at the outset: that process research and experimentation carried out by the suppliers is of direct benefit to the foundry industry as a whole. Within their capacity to do so, founders should co-operate fully with suppliers who seek to improve plant and materials. Only by so doing can the best solutions to mutual problems be found—often it is only the foundrymen who can stage in their shops the real practical tests which give the complete answer to the question as to whether a new product is worthwhile.

Firms and Personnel responsible for Extensions to the Halifax Works of William Aske & Company Limited

Architects	Mr. A. Dobson and Mr. G. Brear, of Walsh, Wilkinson & Coutts, Halifax.
Steel designers and erectors ...	Mr. J. Pollard, of T. G. Binner, Limited, Halifax.
Building contractors	Mr. T. Harvey, of T. Harvey & Son, Huddersfield.
Pipe-fitting and plumbing ...	Mr. J. Haigh, of Jack Haigh (Plumbers), Limited, Halifax.
Lagging	Hornby & Partners, Limited, Bradford.
Electrical contractors	Mr. E. Stafford, of S. Hodgson & Company, Halifax.
Joinery	Mr. C. Moore, of S. Earnshaw & Company, Halifax.
Plant	George Cohen, Sons & Company, Limited, Leeds.
Electronic equipment	Fielden Electronics, Limited, Manchester 22.
Batch meters	Cleveland Meters, Limited, Redcar.
Decorators	Leslie Parkinson, Halifax.
Pumps	Albany Engineering Company, Limited, Lydney, and No-Val Engineering Company, Limited, Bradford.
Landing, erection and design ...	Abram Pulman & Sons, Limited, Halifax.

Company News

EDWARDS HIGH VACUUM, LIMITED, designers and manufacturers of high vacuum pumps, gauges, plant, and accessories, of Crawley (Sussex)—The directors announce that the issue of £450,000 6¼ per cent. convertible unsecured loan stock, 1978-83, at £99 per cent. has been taken up on provisional allotment letters to the extent of £446,992 stock, representing 99.3 per cent. For the balance of £3,008 excess stock a ballot was necessary, 487 applications being received for £603,356 stock.

ENGINEERING COMPONENTS, LIMITED—Group profit, before taxation, for the first six months of 1958 is £190,000 (£201,000). Mr. C. C. Griffith, chairman, says that during the period car and commercial vehicle output increased considerably, but the demand for replacement parts remained fairly constant as compared with the corresponding period of 1957. Group sales over the period show an increase in value of just over 11 per cent. compared with 1957. Costs have tended to rise and in the extremely competitive conditions ruling to-day, profit margins have narrowed. The chairman expresses confidence that the operating companies will hold their own in to-day's markets and in the future.

PLATT BROS. & COMPANY (HOLDINGS), LIMITED—At meetings of the company and of J. Stone & Company (Holdings), Limited, in London recently, resolutions were passed without question or comment approving the proposed merger of the two companies, details of which were published in our issue of July 31, page 150. In the case for the Stone class meetings polls were taken for submission to the court and in each case the chairman, Mr. Kenneth H. Preston, announced that the resolution had been carried by the requisite majority. He said that the only proxies received against the scheme were from two preference holders owning £300 worth of stock and four "A" ordinary holders representing £421.

J. & E. HALL (AUSTRALASIA) PROPRIETARY, LIMITED—The company, a subsidiary of J. & E. Hall, Limited, engineers and ironfounders, of Dartford (Kent), has bought for cash all the issued shares in three subsidiaries of Daniel Scott Industries—Richard Wildridge & Company, Sydney, Wilac Engineering Proprietary, Sydney, and Richard Wildridge Victoria Proprietary, Melbourne. The main activity of the subsidiaries is the manufacture and distribution of refrigerating equipment. Mr. W. S. Hayes, a director of J. & E. Hall, which in turn is controlled by Peninsular & Oriental Steam Navigation, Limited, said it was proposed to expand operations for the manufacture of marine and industrial refrigeration equipment. The amount of capital to be invested in the local company in the first phase of expansion would be in the region of £A500,000.

Davy & United Engineering Debenture Placing

Directors of the Davy & United Engineering Company, Limited, Sheffield, announce that £1,600,000 6¼ per cent. debenture stock 1978-83 has been placed privately by the Industrial Finance & Investment Corporation. Of this amount, £966,000, it is stated, represents consolidation of existing loans. No quotation is being sought at present.

The intention to issue the £1,600,000 debenture stock was announced on June 19. The price then stated was 97½. Also announced was an intention to raise £500,000 this year by a rights issue.

Increases in Capital

F. T. PRODUCTS, LIMITED, engineers, etc., of London, E.C.2, increased by £50,000, in 4s. ordinary shares, beyond the registered capital of £100,000.

LONGFORD WIRE COMPANY, LIMITED, Warrington (Lancs), increased by £50,000, in £1 ordinary shares, beyond the registered capital of £150,000.

HUFFIELD BROS., LIMITED, general engineers, of Stanmore (Middx), increased by £18,500, in £1 ordinary shares, beyond the registered capital of £1,500.

COPE, ALLMAN & COMPANY, LIMITED, tubemakers, of Birmingham, increased by £150,000, in 5s. "A" ordinary shares, beyond the registered capital of £200,000.

WOLVERHAMPTON DIE-CASTING COMPANY, LIMITED, Wolverhampton, increased by £150,000, in 2s. ordinary shares, beyond the registered capital of £450,000.

NORTON ALUMINIUM PRODUCTS, LIMITED, Norton Canes, Cannock (Staffs), increased by £45,000, in £1 ordinary shares, beyond the registered capital of £5,000.

C. S. MILNE & COMPANY, LIMITED, engineers, founders, etc., of London, S.E.8, increased by £45,000, in £1 ordinary shares, beyond the registered capital of £50,000.

J. W. JANES & COMPANY, LIMITED, metal platers, etc., of London, S.E.15, increased by £70,000, in £1 ordinary shares, beyond the registered capital of £2,000.

B. M. RYDER, LIMITED, electrical and general engineers, etc., of Nottingham, increased by £10,000, in £1 ordinary shares, beyond the registered capital of £10,000.

JONAS WOODHEAD & SONS, LIMITED, general engineers, ironfounders, etc., of Leeds, increased by £800,000, in 5s. ordinary shares, beyond the registered capital of £1,200,000.

ALFA-LAVAL COMPANY, LIMITED, separator manufacturers, etc., of Brentford (Middx), increased by £300,000, in £1 ordinary shares, beyond the registered capital of £500,000.

NICO MANUFACTURING COMPANY, LIMITED, lock manufacturers, etc., of Letchworth (Herts), increased by £10,000, in £1 ordinary shares, beyond the registered capital of £30,000.

PASHLEY & TRICKETT, LIMITED, steel merchants, colliery furnishers, etc., of Sheffield, increased by £15,000, in £1 ordinary shares, beyond the registered capital of £5,000.

ARNOLD KINNINGS & SONS, LIMITED, iron masters and founders, etc., of Southport, increased by £52,000, in £1 ordinary shares, beyond the registered capital of £40,000.

JOSEPH SHAKESPEARE & COMPANY, LIMITED, iron masters and founders, etc., of Old Hill (Staffs), increased by £50,000, in 1s. ordinary shares, beyond the registered capital of £150,000.

YOUNG AUSTEN & YOUNG, LIMITED, heating and general engineers, etc., of Leicester, increased by £50,000, in 5s. ordinary shares, beyond the registered capital of £131,000.

FOSTER WHEELER, LIMITED, manufacturers of superheaters, boilers, etc., of London, S.W.3, increased by £800,000, in £1 ordinary shares, beyond the registered capital of £200,000.

PINHOE ENGINEERING & FOUNDRY COMPANY, LIMITED, Channel Bridge, Pinhoe, near Exeter, increased by £10,000, in £1 ordinary shares, beyond the registered capital of £15,000.

BAGSHAW & MORRIS, LIMITED, spring and spring frame manufacturers, etc., of London, E.C.2, increased by £50,000, in 5s. ordinary shares, beyond the registered capital of £150,000.

SAGAR-RICHARDS, LIMITED, die casters and sinkers, engravers, etc., of Luddendenfoot (Yorks), increased by £110,000, in 1s. ordinary shares, beyond the registered capital of £40,000.

H. BEARE & SONS, LIMITED, engineers, iron and brass founders, etc., of Newton Abbot (Devon), increased by £97,000, in 10s. ordinary shares, beyond the registered capital of £15,000.

CHARLES ROBERTS & COMPANY, LIMITED, manufacturers of railway engines, wagons, etc., of Wakefield, increased by £500,000, in 5s. ordinary shares, beyond the registered capital of £1,250,000.

WOLSELEY ENGINEERING, LIMITED, Birmingham, increased by £700,000, in 150,000 6 per cent. cumulative redeemable preference and 550,000 ordinary shares of £1 each, beyond the registered capital of £300,000.

JOHN BOLDING & SONS, LIMITED, brassfounders, engineers, manufacturers of sanitary appliances, etc., of London, W.1, increased by £175,000, in 10s. ordinary shares, beyond the registered capital of £215,000.

MOORE MANUFACTURING COMPANY, LIMITED, tool manufacturers, etc., of Bradford, increased by £50,000, in 7,000 6 per cent. preference and 43,000 ordinary shares, of £1 each, beyond the registered capital of £150,000.

C. G. NORMAN (VICTORIA), LIMITED, engineers, metal founders, etc., of London, S.W.1, increased by £15,000, in 5,000 ordinary and 10,000 6 per cent. cumulative preference shares of £1 each, beyond the registered capital of £10,000.

NEWTON, CHAMBERS & COMPANY, LIMITED, coal and iron masters, etc., of Sheffield, increased by £1,000,000, in 133,000 preference, 608,000 ordinary and 259,000 unclassified shares of £1 each, beyond the registered capital of £2,000,000.

ARTHUR LEE & SONS, LIMITED, steel convertors, etc., of Sheffield, increased by £1,649,900, in 30,000 "A" preference and 120,000 "B" preference shares of £1 each, and 11,999,200 ordinary shares of 2s. 6d. each, beyond the registered capital of £100.

Founding in Sheffield Fifty Years Ago

By J. H. Pearce

This year, the Sheffield branch of the Institute of British Foundrymen is celebrating the Golden Jubilee of its formation. The present secretary, Mr. J. H. Pearce, of English Steel Castings Corporation, Limited, was invited specially to contribute this article on the setting up of the branch.

One evening in October, 1908, about 20 men interested in the foundry craft, met at Sheffield University to hear their leader, Mr. H. Pilkington, a former president of the British Foundrymen's Association, give a lecture on pig-iron specifications.

The lecturer had recently visited America to investigate the types of pig-iron used there. After discussing the differences between English and American conditions and methods, he had formed the opinion that from the ironfounders' point of view there was little scope for the application of American irons in Britain and that for such castings as chilled rolls and car wheels, the British irons gave infinitely superior results. He stated: "The whole of American castings, due to the natural supplies of ore, are all decidedly soft," and added that this country could take no little credit for producing castings which would fulfil the extreme conditions between say, chilled rolls on the one hand, soft iron for machining, dense iron for motor-cylinders or intricate artistic castings for ornamental purposes. However, Mr. Pilkington stressed the point that British chemists and foundrymen had no cause for complacency and urged them to look further into the physical side of pig-iron sampling, grading by fracture and to guarantee a definite silicon content in their pig-iron.

Pioneers

This lecture was the start of the Sheffield and district branch of the Institute of British Foundrymen and Mr. Pilkington was its first president. It is noteworthy that amongst those recorded as present on that occasion were such names as Longmuir, Firth, Swinden and Hatfield. Metallurgy and founding benefited in the years following, and to no small degree, by the efforts of those present on that evening.

During the same year, lectures were presented on a number of subjects varying from "Alloys" to "Mechanical Testing" and "The Scope of Science in the Foundry." The discussions following the lectures were certainly enlivening, suggestions being made that "cast-armour" would replace "forged-armour," that "rolling-mills" might be doomed and that "electrolytic means of production may produce armour-plate, steel rails and other things."

Topics Repetitive

Some of the problems discussed many years ago are still with us to-day. In a paper given by Mr. S. Smith—"Observations of some Principles in the Foundry"—the lecturer dealt with the difficulties of getting uniform thicknesses in castings and emphasized the fact that thick sections close to thin sections were often a source of weakness rather than of strength. In the discussion following, Mr. Longmuir spoke of the value of practical experience and stated that there were more bad castings produced through bad design than faulty workmanship. Another speaker put in a word for the scientific man who would lay the groundwork to be applied to practical experience.

During the first year of the Sheffield branch, 25 new members were enrolled, but commercially the work of the first year of the branch could not be considered so successful, the year's balance-sheet showing a deficit of £1 0s. 11d.!

This autumn, Sheffield founders will pay tribute to these worthy predecessors; their Jubilee celebrations including a special lecture to be given on the anniversary date by Lord Hives, and a works visit to the Sheepbridge Iron Company, Limited, with which firm their first president was connected.

Order for Hawker Siddeley Group

A contract worth £500,000 for free piston and gas turbine power station equipment for Finland has been awarded to three British companies—all of them members of the Hawker Siddeley group. The order was obtained by National Free Piston Power, Limited, and the equipment will be manufactured by the Brush Electrical Engineering Company, Limited, Loughborough, and the National Gas & Oil Engine Company, Limited, Ashton-under-Lyne.

The contract is for two gas turbo-alternator sets and 16 free piston gasifiers of 1,000 h.p. each, with all their auxiliary equipment. It was secured in the face of strong Continental competition. Sir Ian Morrow, managing director of the Brush Group, Limited, said it was the first order for this type of plant in northern Europe.

AEI Project for India

The Government of India has entered into a formal agreement with Associated Electrical Industries, Limited, in respect of a heavy electrical project. In the first phase of the project, AEI will act as agents for the purchase of machine tools and other equipment in the UK and, to a more limited extent, in countries which are members of the European Payments Union.

Credit arrangements have been made with a syndicate of British banks for the deferred payment of the entire foreign exchange cost of these purchases, estimated at Rs.50,000,000 (£3,750,000).

In March last year it was reported that the Indian Government had accepted, subject to minor modifications, an AEI project report for a factory at Bhopal, Central India, for the manufacture of heavy electrical equipment. The £33,000,000 scheme is to be completed in stages by 1968, the first stage by 1960.

Institute of Vitreous Enamellers

Annual School

This year the annual school of the Institute of Vitreous Enamellers is to be held at the Spa Hotel, Buxton, from September 26 to 28, and details of the programme are as follows:—

Friday, September 26

12 noon. Luncheon at North Stafford Hotel, Stoke-on-Trent, followed by works visit to Simplex Electric Company, Limited, Blythe Bridge. *5.00 p.m.* Depart Blythe Bridge for Spa Hotel, Buxton. *8.00 p.m.* Dinner, followed by a discussion on the works visit, or an industrial film, or both.

Saturday, September 27

9.10 a.m. to *10.15 a.m.* Technical sessions: (1) "Electric Fusing Furnaces," and (2) "Preparation of Steel prior to Vitreous Enamelling, with special reference to Automatic Pickling," by Mr. J. Stack. *11.30 a.m.* "Tinted Frits for Sheet Iron and the possibility of Tinted Frits for Cast Iron," by Mr. J. Semple. *2.00 p.m.* "Refractories," by Mr. D. Dixon, A.C.I.S. *3.00 p.m.* "Some New Thoughts on Old Enamelling Problems," by Dr. B. K. Niklewski. *4.30 p.m.* "What are the Prospects of Our Industry, with Special Reference to the Vitreous Enamelling Development Council?" by Mr. S. W. Vickery, chairman of the VEDC, supported by division chairmen, Mr. N. F. Parker (Frit), Mr. C. S. Beers (Architectural), and Mr. R. W. Holmes (Holloware). *7.00 p.m.* Dinner, followed by an address by Mr. J. W. Gardom, past-president and chairman of the technical committee on "The Aims and Objects of the Institute." On Sunday, September 28, following breakfast at 8 a.m. the delegates will disperse.

The fee for attendance at the School, covering luncheon in Stoke-on-Trent, transport from Stoke-on-Trent to Buxton, meals, accommodation and gratuities is £6 10s. per person, and those interested in attending should indicate to the secretary of the Institute, at Ripley, Derby, the number of reservations required; remittances should accompany the completed application form (to be supplied on request).

Order for Babcock & Wilcox of Australia

The State Electricity Commission of Victoria, Australia, has awarded a £5,000,000 boiler plant contract to Babcock & Wilcox of Australia, Limited, a subsidiary of the UK firm. More than a fifth of the work, which is for the Yallourn E Power Station, the latest addition to the Yallourn power project in the centre of industrial Victoria, will be executed in Britain at the Renfrew works of the parent concern.

It is not likely that any further staff will be needed, as the work will be done in the normal course of production. A start is likely to be made around the end of the year.

Announcing the award on behalf of the Victoria Promotion Committee, Sir William Leggatt, Agent-General for Victoria, said: "This is another example of the advantages of British firms establishing themselves in Australia."

Work on the plant, which includes the installation of two boilers for operating continuously with raw brown coal, will begin in October.

SOAG MACHINE TOOLS, LIMITED—Mr. Albert W. Chesney has joined the board of the company and has assumed direction of its associated organization, the Soag Machinery Company.

Confidence in Clydebank

Large tanker orders yet to lay down should ensure for some years to come full employment for the reconstructed berths in the West Yard of John Brown & Company, Limited, which it is hoped will be fully equipped by the middle of next year, says the chairman, Lord Aberconway, in his statement with the accounts for the year to March 31, 1958. As to the adjustments in the building programmes of certain clients of the company, the chairman says the deferment of the laying down of the Cunarder was a matter which Clydebank was readily able to accommodate by bringing forward other contracts instead, while the decision by the British and Commonwealth Shipping Company to change the two tankers ordered to dry cargo ships made no difference to Clydebank.

Lord Aberconway says that work in the shipyard and engine works at Clydebank continues to expand. He expresses confidence that, given reasonable trading conditions, the company can squarely meet whatever is in store.

Firth Brown Tools, Limited

Referring to the fall in group trading profit of Firth Brown Tools, Limited, a subsidiary of John Brown & Company, Limited, from £579,722 to £400,136, the chairman, Lord Aberconway, says that it reflects still more intense competition and a substantial loss of turnover resulting from the April, 1957, strike.

He expresses the hope that efforts in controlling inflation will be successful, as any further cost increases will be highly prejudicial to maintenance of export business. International competition in western Europe and overseas is "increasingly severe," he says, with capacity for many standard lines appearing to exceed current demand. Only the company's ability to give prompt delivery of high-quality products makes it possible to maintain a reasonable output in such conditions.

Group capital expenditure was £171,606 and for depreciation was provided £145,634. Group net profit was £161,697 (£239,545) and the dividend 9 (11½) per cent. for the year to March 31, 1958.

Sir Arthur Matthews does not seek re-election to the board, and Sir Stanley Rawson also wishes to retire.

Manual Workers' Earnings

Provisional figures issued by the Ministry of Labour last week show that the average weekly earnings of nearly 7,000,000 manual workers in Britain were £10 4s. 1d. last April. This was 1s. 8d. more than in October, 1957, and 9s. 6d. more than in April, 1957. The increase in the six months up to last April was the smallest for any half-year since the Ministry began issuing statistics on the present basis in 1947.

Average weekly hours worked last April were 46.2, compared with 46.4 last October. Working hours reached a peak of 46.9 three years ago, since when they have been falling steadily.

In manufacturing industries alone, average weekly earnings rose in the half-year by only 9d., to £10 11s. 11d., and hours worked fell from 45.8 to 45.5. Men's earnings in manufacturing rose by only 1d. a week to £13 1s. 3d., compared with a rise of 12s. 3d. in the previous six months. Their working hours, which fell by 0.1 between April and October last year, had decreased by another 0.4.

Publications Received

Guide for Industry to the Clean Air Act, 1956. Published by the Federation of British Industries, 21, Tothill Street,, London, S.W.1; price 4s.

In the eyes of the local authorities or the Alkali Inspectorate, a foundry is just another local works and not something quite special, and it is just as well that owners should remember this and familiarize themselves with the requirements of the Clean Air Act, and the temporary and permanent exceptions. Under the first heading (Dark Smoke) one of the factors to be borne in mind is that the site of the works may be declared a smoke-controlled area, but this primarily applies to houses and commercial premises. A section dealing with temporary exemptions (of course the whole Act is hedged round with escape clauses) mentions that seven-years' grace is the maximum period before which manufacturers must fully comply with the provisions of the Act by installing smokeless or gritless plant. Exemptions relate to furnaces and processes scheduled under the Alkali, etc., Works Regulation Act, 1906. Into this category enter hot-blast cupolas and electric-arc melting furnaces—but, of course, not the whole works where these units are installed. This easy-to-follow booklet carries lists of firms manufacturing fume- and dust-extracting plant. It rightly stresses the financial gains which may be obtained with certain plant arising from putting combustible gases to good use instead of allowing them to escape into the atmosphere.

Proceedings of the First Advanced Purchasing Course. Published by the Purchasing Officers' Association, Wardrobe Court, 146A, Queen Victoria Street, London, E.C.4; price 10s. 6d., post free.

The booklet reproduces the full text of the lectures given by Professor Howard T. Lewis of the Graduate School of Business Administration, Harvard University, at the advanced purchasing course conducted by the Purchasing Officers' Association at Christ Church, Oxford, in April, 1958.

The section which appealed least to the writer was the one on "Forward Buying Policy," perhaps because the major precepts enunciated do not apply with any great force to the foundry industry, except perhaps the non-ferrous foundry section, where the possibility of making money on the inventory is not unknown. A conversation with a sales manager as to the ease on difficulty of getting orders is probably the best guide as to the wisdom of increasing or decreasing stocks. The section of the book which was illuminating to the reviewer was the one dealing with the actions to be taken when the purchasing officer's works is hit by a strike; malleable ironfounders have recently had experience of such a case. The booklet is well worth study just as much by vendors as by buyers, as in truth, where business is concerned they are inextricably mixed up.

Articles on Storage and Stock Control (Revised Edition). Published by the Purchasing Officers' Association, Wardrobe Court, 146A, Queen Victoria Street, London, E.C.4; price 6s., post free.

This 75-page booklet carries a dozen articles on various aspects of stock-keeping and by doing so implies that there is no standard system applicable to all types of industrial organizations. There is a profound difference in the requirements of an iron and steel foundry and an engineering shop. Bulk deliveries of steel scrap, pig-iron and fuel need a treatment very different from bar stock, nuts and bolts. The latter can be counted and weighed periodically, but not the former. Thus in an excellent article on "A Modern Stores Organization—the North Thames Gas Board's Central Stores," what is presumed to be the major product bought—that is coal—is excluded and this commodity (which has special transport problems attached to it), is dealt with by the coal manager. Bulk deliveries apart, the papers show how stocks and stores can be handled, tested, rust-proofed, accounted for, and correlated with the cost system. Thus there is much to learn from this collection of articles.

Classified Handbook of Members, 1958. Published by the British Engineers' Association, 32, Victoria Street, London, S.W.1; price 21s.

This is the 29th edition of this useful handbook. Although it only covers the products of member-firms, they are sufficiently numerous as to make it thoroughly representative of the British engineering industry. The arrangement is quite simple. After the general information, there is a members' directory, giving all the usual information except the composition of the directorate, and the date of the firm's establishment. Then follow a series of full-page advertisements, after which there is a classified list of members' manufactures. One sub-heading under "Castings"—"semi-steel"—should, in these enlightened days, be deleted. The information contained in this section is given in separate French, German, Portuguese and Spanish sections. Finally, there is a "trade mark" section. This book is a reliable and useful work of reference as to sources of engineering goods.

Accidents, Vol. 36. Published for H.M. Factory Inspectorate by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 1s. 3d. net.

This issue is entirely given over to accidents attributable to faulty maintenance. In the opinion of the writer, it is not the more-important items of equipment that cause accidents (because usually there is a qualified staff to ensure their proper maintenance), but ordinary hand tools. One of the reviewer's best workmen lost an eye through using, despite constant warning, a pricker-bar which had developed a "mushroom" head. Rightly, this issue warns people against slipping a pipe over the end of a spanner to get increased leverage, as it often induces later slipping. The Editor of this JOURNAL still questions whether the use of "horrific" illustrations in this publication serves any useful purpose, and thinks they would serve better as safety-first posters.

Tin and Its Uses. Published by the Tin Research Institute, Fraser Road, Greenford, Middlesex.

This issue will appeal to those who are interested in art foundry practice, for there is a long, beautifully-illustrated article on the tin shrines of the Hapsburgs, in the crypt of the Capuchin Monastery, which date from the seventeenth century. The tomb of the Empress Elizabeth Christina is a particularly pleasing example of the Rococco style.

Lifting and Carrying. Published for the Ministry of Labour and National Service by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 1s. net.

There are no fewer than 50,000 accidents each year happening in factories and whilst some people have a natural knack of safe lifting, others have no natural aptitude. Obviously these people require showing—training is too strong a word. This booklet (No. 1 in the new Safety, Health and Welfare series), by letter-press and illustration, serves a useful purpose as a

medium for instructing entrants to industry. It should, if the contents be properly applied, do much to reduce the annual total of accidents. No. 3 of the series (price 2s. 6d.), which has also been received, deals with safety devices for hand and foot-operated presses.

List of Sandwich Courses Approved by the Ministry of Education in Further Education Establishments in England and Wales. Published by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 1s. 6d. net.

Only one college in England and Wales—that is, the Constantine Technical College, Middlesbrough—is listed in this publication as being accorded recognition for the teaching of foundry practice. It is bracketted equal with vitreous enamelling which is being undertaken at the North Staffordshire Technical College, Stoke-on-Trent.

Sir John Cass College Prospectus, 1958-59. Issued from Jewry Street, Aldgate, London, E.C.3.

This College is recognized by the University of London for the award of internal degrees in science and metallurgy, and the time-tables for these courses are set out in the prospectus, which is available on writing to the principal of the College.

New Catalogues

Pneumatic Tools. B. O. Morris, Limited, Morrisflex Works, Briton Road, Coventry, have, in List ZA1, detailed the characteristics and prices of a wide range of pneumatic drills, grinders, hammers and other tools.

Gas Analysers. List 144/B/II, issued by the Cambridge Instrument Company, 13, Grosvenor Place, London, S.W.1, is a four-page publication describing accessories such as aspirators, absorption chambers, flow gauges, etc., which are employed with Cambridge gas analysers of the thermal-conductivity type. It supplements list 144/B/I, which describes analysing equipment for a very wide range of gas combinations.

Bin Units. A four-page leaflet received from Pegson, Limited, Coalville, Leicestershire, carries illustrated specifications for a line of round, square and semi-portable storage bins. These are not intended for housing nuts and bolts, but do duty for the bulk storage of coke, sand and the like, with space beneath for a goods wagon or lorry to be stationed for automatic filling. It is a useful publication to have available.

Corrosion- and Heat-resisting Steel Castings. Using a nicely-illustrated 20-page pamphlet, Firth-Vickers Stainless Steels, Limited, have, in publication No. 111/2, very well covered this subject. The booklet opens with suggestions to buyers, and in the next section calls attention to the variation that occurs in pattern contraction allowances with alloys entering into the corrosion- and heat-resisting category. They range from one in 38 to one in 77. Such questions as to whether hand or machine moulding, are to be applied or if heat-treatment and machining are required all come into consideration. Towards the end of the brochure, tables are set out showing the mechanical and other properties of castings made in this range of alloys, excepting those centrifugally cast.

The June issue of *BSI News* lists under "Revised British Standards" 310:1958 Blackheart-malleable Iron Castings, price 4s.

House Organs

Bulletin No. 53. Issued by the Association of Bronze and Brass Founders (privately circulated).

A list is published in this *Bulletin* of all the English and Welsh colleges and institutes which have arranged classes in foundry practice and patternmaking, either as day or evening classes. No fewer than 72 are listed, and of these 46 include patternmaking.

Crossley Chronicles, No. 204. Issued by Crossley Brothers, Limited, Openshaw, Manchester, 11.

This issue is devoted to the handling equipment at the Bradwell, Essex, nuclear-power plant. It includes a description of the largest "Goliath" crane in the world, for which all the electric power is supplied by a Crossley-engined generator set.

Monsanto Mail, No. 1. Published by Monsanto Chemicals, Limited, 10-18, Victoria Street, London, S.W.1.

There is no indication given as to the frequency of issue of this admirable publication. It is a "glossy" magazine in the best sense of the word. Excellent use has been made of colour printing, whilst the articles appearing are alike interesting and stimulating.

Broomwade News Bulletin, Vol. 21, No. 3. Issued by Broom & Wade, Limited, High Wycombe.

This issue reports on the exhibits shown by the company at Earls Court (Mechanical Handling Exhibition) and the Brussels Exhibition. It also announces the marketing of a lorry-mounted compressor, using a Ford "Thames" chassis. Balancing suspension gear for use with small bench-tools is dealt with—this handy arrangement is increasing in popularity.

Albion Works Bulletin. Vol. 12, No. 1. Issued by John Harper & Company, Limited, Albion Works, Willenhall.

An interesting note on the Hardware Trades Fair appears in this issue. It reads, "Our first exhibition in London was a success. We received nearly 300 trades buyers in the five days of the Fair. This compared very favourably with an almost similar number at last year's British Industries Fair, which was open for 11 days."

Newsletter. Vol. 10, No. 6. Issued by the David Brown Group of companies, Huddersfield.

A postscript appears in this issue which states that following *Newsletter's* article last month on David Brown association, through the supply of gear units, with the ram-jet test plant installed by Bristol Aero Engines, a number of components for the plant were cast at Penistone. These included blowing nozzles and spill diffusers, cast in corrosion-resisting steel, together weighing more than 16 cwts.

Staveley News. Vol. 7, No. 3. Issued by the Staveley Iron and Chemical Company, Limited, near Chesterfield.

Contained in this issue is an interesting account of the visit of the apprentices to the Continent last spring, when 16 young men, representative of the many crafts and professions at Staveley and Sheepbridge travelled with five officials on a coach visit to Belgium, Luxemburg, Germany and France. During the 11 days' trip they covered nearly 1,800 miles and visited also a number of industrial installations in the Ruhr and in France. There is an account in the booklet of the execution of an order for 27,000 tons of pig-iron destined for the Argentine.

Equipment & Supplies

Continuous Sand Mill

To economize in floor space in foundries is one of the ideas that Foundry Equipment, Limited, Leighton Buzzard, Bedfordshire, have borne in mind in designing their new "Con Belt" mill, for which patents are pending. They claim to have incorporated all the principles of their time-proved circular-pan continuous mills, and regard the new mill as a logical development in that there is a limit to the size and capacity of pan-type mills, but this restriction does not apply to the new type.

As shown in Fig. 1, milling is carried out continuously on a series of belt "decks," the sand flowing from one to the other, all the time being mixed and milled. Capacity is determined by the number and size of belts. Additions such as coal-dust and bentonite are made by vibratory feeders at the top and atomizers add moisture to the sand without wetting the belts. As the sand passes through the mill it is disintegrated, and milled continuously by powered rollers running at a speed differing from that of the belt. This type of movement produces a rubbing action through the sand stream. The final result is a continuous flow of sand delivered in prime condition for moulding. Standard models up to 225 tons per hour capacity are available and plans for mills of up to 500 tons per hour are contemplated.

FIG. 1.—*FE "Con Belt" mill for the continuous preparation of moulding sand.*

KEY: (*a*) Feed hopper and sand flow regulator; (*b*) additions hoppers, with vibratory feeders; (*c*) first disintegrator/mixer; (*d*) moisture atomizer; (*e*) first mulling belt deck; (*f*) powered rollers; (*g*) second mulling-belt deck, and (*h*) aerators.

Chipping Hammer

Produced by Rockweld, Limited, Commerce Way, Croydon, Surrey, a chipping hammer designed to provide a balanced, durable tool for removing slag and spatter after welding, would seem to have a number of applications in foundry practice. The head is of hardened and tempered carbon steel, and comprises a chisel edge and long, narrow pick—useful for removing slag or "flash" from tight corners and pockets. The handle is formed from oval-section mild steel tube, the tool being about 11-in. long, and of welded construction.

WESSEX INDUSTRIES (POOLE), LIMITED, West Street, Poole, Dorset, announce that they are now producing a new model (E4 12 P) of their line of electric battery pallet trucks. The hydraulic pump and ram unit is either manually or power operated. It is completely enclosed in a small housing which also carries the motor, reduction gearing and controller.

EXPERIENCE IN THE MANUFACTURE of contents-gauge systems for use in the aircraft and industrial fields has enabled Firth Cleveland Instruments, Limited, of Treforest, Glamorganshire, to develop a new range of instruments which will be known under the registered trade mark of "Pacitran." These include a fuel-contents gauge, and a liquid oxygen gauge. Both are small transistorized servo-driven devices of light-weight design giving high accuracy and reliability.

LANSING BAGNALL, LIMITED, Kingsclere Road, Basingstoke, Hampshire, have introduced a safe-load-capacity indicator into their cantilever type of fork-lift truck so that the driver knows the precise loading condition of his machine. The mechanism is so sensitive that even a slight pressure of the fingers on the toe of the fork causes a variation in the indicator pointer. This pneumatic capacity indicator is patented throughout the world by Lansing Bagnall and is offered as an extra for use on any truck in their range which is fitted with a tilting mast.

News in Brief

ARISTON ALLOYS, LIMITED, Mill Lane, Croydon, Surrey, announce that due to expansion of business an additional factory situated in Stafford Road, Croydon, has been acquired.

KELVIN & HUGHES (MARINE), LIMITED, report the receipt of an initial order for 26 sets of radar equipment which has been placed by the German Ministry of Defence; the sets to be installed in German Naval vessels.

GROSS LIABILITIES of £457,831 and assets estimated to realize £412,562 were reported at the first meeting of creditors of Peto Scott Electrical Instruments, Limited, a wholly owned subsidiary of Pena Industries, Limited (also in liquidation).

AN UNDERFLOOR AIR-FEED FIRE—to be known as the Hearth Redfyre—is being introduced for the autumn heating season by Newton Chambers & Company, Limited, of Thorncliffe, near Sheffield, and is available to the trade immediately.

THE LONDON SALES OFFICE of Brook Motors, Limited, formerly at Westminster, has been transferred to larger offices in a new building at 1-2, Finsbury Square, E.C.2.

A PAMPHLET received from J. Brockhouse & Company, Limited, Elm Works, Penn Road, Wolverhampton, entitled "Engineered Rebuilding," describes the facilities the works possess for the rebuilding or actual designing of machine-tools.

THE FACTORY EQUIPMENT EXHIBITION will be held at Earls Court from April 7 to 17 next year, but on this occasion the name is to be changed to the "Heat and Sound Exhibition" because of the great interest shown in the insulation of buildings.

AN ORDER has been received by Wild-Barfield Electric Furnaces, Limited, of Watford, from the Hunslet Engine Company, Limited, of Leeds, for a large gas-carburizing furnace 48-in. dia. by 54-in. deep operating on the Carbodrip drip-feed system.

UNION CARBIDE, LIMITED, alloys division, 103, Mount Street, London, W.1, have prepared a catalogue of the very large number of publications they have made which are germane to the products they manufacture. It is available to readers on writing to Mount Street.

"ANCIENT BRITONS," the float entered by the Dover Engineering Works, Limited (ironfounders), not only gained first prize and cup in the class for Trades Council entries at Dover Carnival, but was also awarded the Hawkfield Cup in the "open" class.

IN THE FIRST four months of this year Sierra Leone exported 614,495 tons of iron ore, compared with 490,315 tons in the corresponding period of last year. The UK, according to Barclays Bank DCO, so far has taken the largest tonnage, with Holland next on the list.

ABOUT 100 MEN working in the blast-furnace department of Clay Cross (Iron & Foundries), Limited, Chesterfield, have been given two weeks' notice. An official of the company, which employs over 600 people, said that a lack of orders and a recession in trade generally had forced the closure of the furnace plant.

FIFTY MEN employed in the foundry of Beans Industries, Limited, Tipton, one of the largest car-component manufacturers in the Midlands, received notice of termination of employment on August 16. The company stated that the move, which it hopes will be only temporary, is the result of overproduction at the works owing to a hold up in car production at Coventry and elsewhere.

RESULTING FROM an agreement between Aluminio Portuguese (Angola) SARL and the Compagnie de Produits Chimiques et Electro-metallurgiques, Paris, a new aluminium factory with an annual output of 50,000 tons is to be constructed in Angola. The French concern, which is investing in the project, will be responsible for the technical direction of the enterprise, and a French group will supply the plant and equipment.

THE LIGHT IRON DEPARTMENT of Argus Foundry, Limited, Thornliebank, near Glasgow, is to cease production at the end of September and about 170 employees will be dismissed. The company is a subsidiary of G. & J. Weir, Limited, the Glasgow engineers and founders. The directors of Argus Foundry said that the reduced demand for light iron now made it unprofitable to continue this section of the company's business.

THE CONSTANTINE TECHNICAL COLLEGE, Middlesbrough, is one of the few educational institutes in the country to offer a two-year ordinary diploma in patternmaking and foundry technology. It is a well-balanced curriculum and includes lectures in English. In addition part-time courses are available in both patternmaking and foundry technology. Prospectuses covering the two courses are available from the principal, Dr. G. S. Atkinson.

THE EUROPEAN ORGANIZATION FOR QUALITY CONTROL is holding a three-day conference at Essen from September 10 to 12, on the subject of "Consumer-Vendor Relations." Papers to be presented at the conference will deal with the general, engineering, statistical, practical and theoretical aspects involved in the subject. Application forms and further particulars can be obtained from British Productivity Council, 21, Tothill Street, London, S.W.1.

A SCIENTIFIC-DEMONSTRATION PAVILION is to be built in the new town of East Kilbride, near Glasgow, at a cost of over £60,000. The pavilion, which it is expected will take about 18 months to complete, will be built on the lines of a university lecture room and will have tiered accommodation for 200 persons. It is to be erected adjacent to the present premises of the Department of Scientific and Industrial Research, and will be equipped with all the apparatus necessary for the demonstration of scientific discoveries and improvements.

NORTH BRITISH LOCOMOTIVE COMPANY, LIMITED, have been awarded a contract for 53 diesel locomotives, out of a total of 83 ordered for British Railways under the modernization plan. Thirty-three of these will be of 2,000 h.p., with a maximum speed of 90 m.p.h. for express passenger and freight services, and 20 will be of 1,100 h.p., capable of 75 m.p.h. on geeneral mixed traffic duties. The 1,100-h.p. locomotives now ordered will be similar to 28 of the same type ordered by the British Transport Commission some time ago, and in all the N.B. Company hold contracts for more than 80 main line locomotives together with a variety of other work.

SAMUEL FOX & COMPANY, LIMITED, a subsidiary of the United Steel Companies, Limited, announce that their research department will be known as the metallurgical department from September 1. The change of name has been made to reflect more accurately the nature of the department's duties. On the same date, the responsibilities of the works metallurgist, Mr. R. Wilcock, will be broadened. He will be responsible to the chief metallurgist, Mr. R. D. Pollard, for all aspects of the company's internal activities in the

metallurgical field—process and research metallurgy, the chemical laboratory and the test house. Mr. Roy Whittaker, who was formerly employed in the department, is rejoining Samuel Fox to become process metallurgist.

AN ORDER of the value of about $100,000 for a continuous hydrostatic pressure sterilizer produced by the food-machinery division of Mitchell Engineering, Limited, of Peterborough, is being shipped to Canada at the end of this month for the factory of a canning company. Known as the Hydron, a machine of this type is capable of sterilizing and cooking approximately 800 domestic-size cans of vegetables a minute. Powered by a 10-h.p. electric motor the speed of processing and output can be remotely controlled by one man. It has a maximum working temperature of 262 deg. F. Similar machines have been exported to Russia, Switzerland, Belgium and Australia during the past 12 months. A number are also in use at several major canning plants in Britain.

WITH an "At Home" to families and a "key-turning" ceremony attended by staff and local officials, Honeywell Controls, Limited, recently celebrated the official opening of its new head office building in Greenford, Middlesex. The building was declared open by Mr. Harold Sweatt, chairman of the Honeywell organization, who had come over from Minneapolis, home of the company's American associates, for the ceremony. Addressing the staff, Mr. Sweatt said: Although instrument manufacture was started only eight years ago, the firm is already among the largest manufacturing companies in the United Kingdom. The factory now covers 166,000 sq. ft. whilst there are 10 fully-equipped branch offices to create a nation-wide marketing organization. The size and amenities of this new head office building are further testimony to their phenomenal rate of growth.

"Atoms for Peace" Exhibition

At the "Atoms for Peace" Exhibition, to be held from September 1 to 14 in Geneva, an effort will be made to show the world what Britain has achieved in the field of nuclear engineering. Seventy-nine British firms will occupy stands in the 40,000-50,000 sq. ft. of space reserved by the Nuclear Energy Trade Associations' Conference of Great Britain. The exhibition will be held in the Palais des Expositions at Geneva concurrently with the 2nd International Conference on the Peaceful Uses of Atomic Energy, which will take place in the Palais des Nations. Specialists from all over the world will be attending the conference. In order to make sure that as many as possible are able to visit the industrial exhibition, a special bus service between the Palais des Expositions and the Palais des Nations has been arranged, and 1,500 conference delegates and pressmen will receive invitations to a joint UKAEA NETAC reception. In what follows details are given of a few of the many firms whose exhibits will make up the British contribution.

THE MOND NICKEL COMPANY, LIMITED *(Stand No. 21)*, and its associate Henry Wiggin & Company, Limited, will feature their world service of technical information about nickel containing materials and the role of nickel in the field of nuclear engineering.

SAVAGE & PARSONS, LIMITED, Watford, Herts, will exhibit a pre-production model of their new multi-point thermocouple temperature recorder, which provides a permanent printed record of the temperature being measured from any one of up to 500 points, the time at which it was taken and the channel identification. The recorder consists, basically, of two units—one contains a precision voltage supply for the thermocouples, and the printing head, motor-driven slidewire and servo equipment, and the other unit is an extension box housing 50 thermocouple connections, selector switching and provision for a "cold junction oven."

THE HAYWARD TYLER COMPANY, a member of the Platt Group, is exhibiting a sectioned model of their glandless motor-pump unit which comprises a single shaft rotating in two journal bearings within a pressure-tight casing. The upper part of the shaft carries the motor rotor, the pump impellor being at the lower end. The electric supply cable, entering the casing through sealed stationary glands, is coupled to the plastic-covered stator windings which are immersed in the liquid which is being pumped. Cooling is effected by a circulating impellor incorporated in the thrust bearing, and by an external heat-exchanger. Pumps of this type are employed in the primary and secondary circulation systems of nuclear reactors. Also on display will be an illuminated diagram illustrating the operation of the steam-generating system in a nuclear power-station.

THE TALBOT STEAD TUBE COMPANY, LIMITED, Green Lane, Walsall, will be showing the following items on the TI Nuclear Engineering, Limited, stand *(No. 142)*:—pressure vessel; breeder thermocouple guide tubes; fuel element support; restraint bar; charge plug; stainless-steel tubes and flanges.

In addition to these the following scale models will be on show:—Control rod—fabricated from stainless steel with boron inserts; restraint bar—fabricated from mild steel with an outer tube with four other tubes inserted. The centre bar is inserted in the smallest tube; charging standpipe assembly—fabricated from mild steel. The upper portion consists of an outer tube concrete-filled with four tubes inserted. The lower portion consists of large tube with smaller tube fixed on the outer wall.

GEORGE KENT, LIMITED, Luton, are displaying a number of recently introduced products, many of which are being shown on the Continent for the first time. The main item of interest is the "Multelec" Mark 3 high-speed electronic strip-chart recorder, available for such applications as temperature, millivoltage, reactor power-level measurement (both linear and logarithmic); reactor power-drift measurement; gamma health monitoring; gamma activity in fluid circuits; control arm or rod position and analogue-computers. A particularly interesting version of the instrument is a multi-point scanner with a new presentation system. It will be shown recording the readings from 90 individually scanned points on a single chart, with clear identification of each reading.

A newcomer to the Kent range of electronic industrial instrumentation is the manually set on/off electronic controller, which has been designed for those applications where neither indication nor record of the variable is necessary as in shut-dwn amplifiers, or alarm applications. The controller compares the e.m.f. from, for example, a thermocouple, with that from a manually-set potentiometer slidewire and amplifies the difference. The amplifier, which operates a relay when the detecting element reaches a pre-set temperature value, is incorporated in the instrument. Signal lamps are fitted adjacent to the desired-value-setting index to indicate when the measured value is "high" or "low." An "upscale- or downscale-drive" is included within the amplifier and may be used to operate the relay in one direction or the other should the primary element become open-circuited.

Personal

Mr. C. A. JACKSON has been appointed a director of Raleigh Industries, Limited.

Mr. T. COUGHTRIE has joined the board of Bruce Peebles & Company, Limited.

Mr. I. F. LEY has been appointed a director of Ley's Foundries & Engineering, Limited.

Mr. N. D. HARRIS, Dr. P. A. LINTERN and Mr. S. G. TINSLEY have been appointed directors of the British Titan Products Company, Limited. Dr. Lintern and Mr. Tinsley have been with the company for many years.

Mr. KENNETH N. DAVIS, the chairman of the Council of Ironfoundry Association's Recruitment, Training and Education Committee, last Sunday night participated in a televised discussion on "Human Relations in Industry."

Wilmot Breeden Fellowships for 1958, have been awarded to Dr. V. S. K. NAIR of the University of Glasgow, and Mr. P. J. WHYBROW of the Royal Aircraft Establishment. They will be held in association with the Birmingham College of Technology.

Capt. R. L. JORDAN, formerly engineer manager of the Royal Naval Dockyards, Chatham, has been appointed a director of Fawcett Preston & Company, one of the Metal Industries group. Mr. A. J. TAYLOR has been apointed contracts manager of the company.

Dr. D. H. HOUSEMAN, who has held the W. J. Rees Research Fellowship in the Department of Refractories Technology at Sheffield University since 1955, has been appointed head of the Metallurgy Department at the Sir John Cass College and takes up his duties next month.

Mr. J. M. FLETCHER, senior member of the staff at the Torpedo Experimental Establishment, Greenock, has been appointed a lecturer in engineering drawing at the Royal College of Science & Technology, Glasgow. Mr. Fletcher is Provost of Gourock and was one of those selected to go to Portland next year when the Greenock factory closes.

Birfield, Limited, announce that Mr. S. WALKER has retired as managing director of Laycock Engineering, Limited, on reaching the age of 65, but has been appointed vice-chairman of that company. Mr. W. E. THOMPSON and Mr. K. WALKER have been appointed joint general managers. Mr. S. WALKER has also been appointed additional director of Birfield, Limited.

Mr. H. MORLEY, deputy general works manager of Samuel Fox & Company, Limited, a subsidiary of the United Steel Companies, Limited, will become general works manager of the company on September 9, in succession to Mr. J. D. JOY. Mr. Joy has been appointed director and general works manager of Appleby-Frodingham Steel Company with a view to becoming deputy general manager on January 1 next.

Mr. J. GARDNER, the general secretary of the Amalgamated Union of Foundry Workers, retired under the age rule on August 4. Mr. Gardner held the position for 14 years and he will best be remembered by the industry as a whole for the useful help he gave as a member of the Joint Standing Committee on Conditions in Foundries. The good wishes of the industry will go to him for a happy and peaceful retirement. He is succeeded by Mr. T. GRAHAM, who for some time has been the assistant general secretary.

Dr LLEWELLYN DOUGLAS (a member of the South African branch of the IBF), chief mechanical engineer of South African Railways, has been appointed assistant general manager. Dr. Douglas joined the SAR in 1925, as a pupil mechanical engineer at Uitenhage; in 1937 he became locomotive superintendent in Pretoria and in 1943 he was appointed advisory engineer in Washington. He returned to the Union in 1946 to become engineer responsible for workshops' layout, and became chief mechanical engineer in 1954, after six years as assistant chief. In his new capacity he will be stationed in Johannesburg.

International Nickel Company of Canada, Limited, announce that Mr. WILLIAM M. FRAMES, of Johannesburg, formerly chairman of Rand Mines, Limited, has been appointed chairman of the International Nickel Company S.A. (Proprietary), Limited, South African subsidiary of the International Nickel Company of Canada, Limited. Mr. Frames continues as a director of Rand Mines, Limited, with which he has been associated for 37 years, and as a director of other companies. He is a member of the Associated Scientific and Technical Society of South Africa and a fellow of the Chartered Institute of Secretaries of London.

A number of personnel changes are announced by the British Insulated Callender's Cables group. Mr. O. J. CROMPTON has been appointed general manager of the British Insulated Callender's Cables Construction Company, Limited; Mr. G. A. RENDLE becomes deputy general manager and continues as manager of the power cable and telecommunications cable contracts departments. Mr. E. T. Q. DAVIES has been appointed a director and remains manager of the overhead line contracts department. Mr. F. B. KITCHIN has retired from the board and has relinquished his directorship of British Insulated Callender's Cables (Australia) Pty., Limited. Mr. G. H. WALTON, who has been joint general manager of the Construction Company with Mr. Crompton since 1956, has relinquished his executive duties on reaching the retirement age, but remains available for consultation and for special duties. He continues as a director of the company and of British Insulated Callender's (Submarine Cables), Limited, Painter Bros., Limited, and Engineering Projects, Limited.

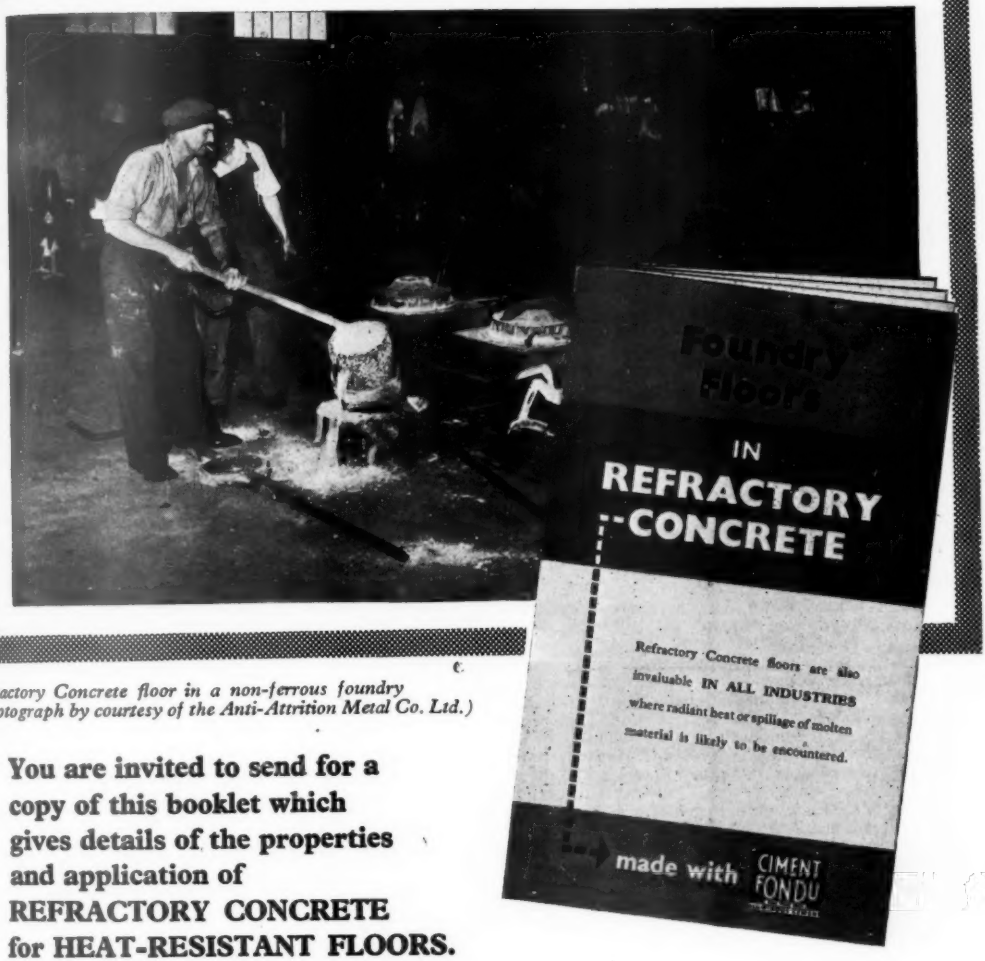
Obituary

The death is announced of Mr. NORMAN G. WIDGER, publicity manager of G. & J. Weir, Limited, the Glasgow engineers. He had been with the company since 1940.

Mr. ALBERT SADLER RIGLEY, chairman and joint managing director of the Nottingham engineering and railway wagon building firm of William Rigley & Sons, Limited, died on August 17 at the age of 76. He was the eldest son of the founder of the firm.

Mr. JAMES SMART, general manager and a director of the Grangemouth Dockyard Company, Limited, died on August 16 at the age of 65. Mr. Smart, who was appointed MBE in 1943 for his services to shipbuilding during the war, joined the company in 1927.

Mr. FREDERICK HAMILTON KEATING, chief metallurgist in the engineering research department of Imperial Chemical Industries' works at Middlesbrough, died on August 16. Mr. Keating was the author of several standard textbooks. He was the first chairman of the Tees-side Institution of Metallurgists and a member of the Council of the British Welding Research Association. When, in 1952, the North-East Metallurgical Society was formed by about 100 metallurgists in the north-east, Mr. Keating became a vice-president of the Society.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Raw Material Markets

Iron and Steel

Following the resumption of work at many of the ironfoundries after the annual holidays, deliveries of raw materials against orders on hand have recommenced and suppliers are able to effect prompt despatch from the stocks on hand. The blast furnaces have accumulated substantial tonnages of pig-iron and their stocks have been increased by the suspension in deliveries. Although the despatches they are now able to make will relieve their position to some extent, they are insufficient fully to absorb their outputs or to decrease stocks appreciably.

The lessened demand for supplies of steel and the consequent reduced outputs of ingots has had a marked effect on the call for basic pig-iron, and, although some furnaces previously burdened for this grade have closed down and others have curtailed outputs, makers find it difficult to dispose of the tonnage at present being produced. To fulfil old contracts some consignments of basic iron, although on a considerably reduced scale, are still being received from overseas, but these exceed requirements and add to existing stocks.

The demand for pig-iron from the foundries shows little change. In all grades deliveries could be stepped up should the foundries require extra tonnages. The low-phosphorus irons continue to be in greater demand, but producers would welcome an even bigger demand to enable them to eliminate some of their stocks and also to distribute a much larger proportion of their outputs. Although increased production has made available additional quantities for the engineering and speciality foundries, orders are not available fully to utilize these supplies, resulting in increasing stocks at the furnaces. Makers of hematite and high-phosphorus irons are also carrying heavy stocks, and, without exception, producers of all grades of pig-iron would welcome a revival in demand to reduce their present economic burden.

Demands for castings follow closely the pattern which has ruled for some time. High-duty castings are in heaviest demand, and this ensures production at fairly good levels at the engineering and speciality foundries. Light castings continue in moderate demand, resulting in fluctuating production at the foundries, and, in many instances, short-time working. The textile foundries are similarly placed, and a number of the jobbing foundries find orders difficult to obtain.

Scrap is available in adequate tonnages to satisfy all demands and, apart from some of the Welsh foundry cokes, most other brands are plentiful. Ganister, limestone, and firebricks are in good supply.

The re-rollers continue to have difficulty in obtaining sufficient work to keep plants fully occupied. Orders for all their products continue scarce, thereby still curtailing their demand for steel semis. Home steelworks are able to satisfy present demands without difficulty, and could increase their outputs considerably if demand warranted.

Many of the mills continue to work on short time, and rolling programmes are difficult to arrange with the present limited requirements of customers.

Non-ferrous Metals

In Washington on Thursday of last week, the House of Representatives killed the Minerals Subsidy Bill by 182 votes to 159. The House rejected the measure after eliminating tungsten and fluorspar from the proposed subsidy scheme and adding an amendment forbidding federal payments to mineral producers who declared dividends or transferred any funds to surplus accounts. The Bill was defeated despite Administration support and the backing of leaders on both sides.

In London on the following day, copper reacted sharply to the news from Washington and was £7 10s. a ton down on the previous day's quotation. Recent firmness in copper had largely stemmed from hopes that the Bill, with its proposal to stockpile 150,000 tons of copper at prices up to 27½ cents a pound, would be adopted. Rejection of the US Bill, however, stimulated a recovery in London lead and zinc prices, the recovery stemming from the fact that the Bill proposed subsidy payments to US lead and zinc producers.

Copper has also had to absorb the shock of Kennecott increasing the working week at its US mines to six days a week. This is the second production advance this year and comes after only a fortnight after its Western US mines returned to five-day working following three successive cutbacks in the early part of the year. Kennecott is the largest US producer and the latest moves brings its annual rate of output to a third below the 1957 level at 259,500 tons annually.

In tin, the market is still awaiting for a clear lead on the subject of Russian offerings to the market and of her future status in the International Tin Council. Feeling in Malaya is growing against Russia's refusal to share responsibilities as well as rights under the international tin agreement and the charge has been laid that Russia is deliberately trying to sabotage the agreement. In these circumstances the cash price is having to be supported by the buffer stock manager and business is at a low level. In America the market is no better, with the price weak at 94.5 cents a pound Stocks of tin in the UK at the end of last week totalled 12,342 tons.

Talks which may prove a turning point in labour relations on the Copperbelt began at Kitwe on Saturday between the North Rhodesian European Mineworkers' Union and the Chamber of Mines. The talks were resumed on Monday. At the end of the first day's deliberations the parties concerned issued a joint statement announcing that the copper-mining companies would restore the *status quo* which existed before July 1, when they sent an ultimatum to the union that they would require non-artisans to do disputed jobs. Meanwhile, the union has voted by 3,845 to 193 to keep its "closed shop" agreement with the mining companies for the next three years. The agreement stipulates that no man will be employed on the mines unless he is a union member.

Association of Bronze and Brass Founders

A meeting of London-area members of the Association of Bronze and Brass Founders is to be held on September 3 at the Clarendon Restaurant, Hammersmith, commencing at 11.45 a.m. The meeting will commence with a report and discussion of the Association's current activities, and after luncheon, at 1 p.m., will recommence at 2.15 p.m. with a talk by Dr. D. V. Atterton on the "Surface Finish of Castings with Particular Reference to Copper-alloy Castings." The lecture will be based on the report of sub-committee TS.48 of the Institute of British Foundrymen, of which Dr. Atterton is chairman.

LANCASHIRE DYNAMO HOLDINGS, LIMITED—Mr. Stanley F. Steward, hitherto chairman and managing director, has relinquished his appointment as chairman in favour of Lt.-Col. G. S. Marston. Mr. Steward remains managing director, but has informed the board that he will not seek to renew his service agreement when it expires next February. Mr. D. C. Lorkin has been appointed an additional managing director.

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Current Prices of Iron, Steel, and Non-ferrous Metals

(*Delivered unless otherwise stated*)

August 27, 1958

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £23 17s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £24 1s. 3d.

Scotch Iron.—No. 3 foundry, £25 3s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 19s. 0d.; South Zone, £26 1s. 6d.

Refined Malleable.—P, 0.10 per cent. max.: North Zone, £27 6s. 6d.; South Zone, £27 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.: N.-E. of England (local iron), £25 6s. 6d.; Scotland (Scotch iron), Zone S.1, £25 13s. 0d.; Sheffield, £26 15s. 0d.; Birmingham, £27 4s. 0d.; Wales (Welsh iron), £25 6s. 6d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics.

FERRO-ALLOYS

(*Per ton unless otherwise stated, delivered*)

Ferro-silicon (6-ton lots and over).—45 per cent. Si £47 0s. 0d. to £47 10s. 0d., scale 17s. 0d. per unit; 75 per cent. Si, £66 0s. 0d. to £66 10s. 0d., scale 17s. 0d. per unit.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 6d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 6s. 6d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 9s. 6d. per b. of W.

Ferro-chrome (6-ton lots and over).—4/6 per cent. C, £83 10s. 0d. to £87 0s. 0d., basis 60 per cent. Cr, scale 30s. 0d. to 30s. 6d., per unit; over 6 per cent. C, £79 10s. 0d. to £85 0s. 0d., basis 60 per cent. Cr, scale 30s. 6d. per unit; 2 per cent. C,* 2s. 0d. per lb. Cr; 1 per cent. C,* 2s. 0½d. per lb. Cr; 0.15 per cent. C,* 2s. 1½d. per lb. Cr; 0.10 per cent. C,* 2s. 1¾d. per lb. Cr; 0.06 per cent. C,* 2s. 2d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £265 0s. 0d.; 96/98 per cent., £295 0s. 0d.

Ferro-columbium.—65/72 per cent., Nb + Ta, 19s. 9d. per lb., Nb + Ta.

Ferro-manganese (home).—78 per cent., £78 0s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., £32 15s. 6d.; tested, 0.08 to 0.33 per cent. C, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), £34 17s. 0d.; silico-manganese, £43 16s. 6d.; free-cutting, £36 14s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

* Average 68-70 per cent.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.33 per cent. C, £38 10s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £40 0s. 6d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, £39 0s. 0d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £44 16s. 0d.; black sheets (hand mill), 24g., £58 14s. 6d.; galvanized corrugated sheets, 24g., £66 16s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £68 10s. 0d.; nickel-chrome, £99 11s. 0d.; nickel-chrome-molybdenum, £111 19s. 0d.

NON-FERROUS METALS

Copper.—Cash, £203 5s. 0d. to £203 10s. 0d.; three months, £203 10s. 0d. to £203 15s. 0d.; settlement, £203 10s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 2s. 0½d. per lb.; rods, 235s. 0d. per cwt. basis; 20 s.w.g., 268s. 3d. per cwt.

Tin.—Cash, £730 0s. 0d. to £730 10s. 0d.; three months £730 10s. 0d. to £731 0s. 0d.; settlement, £730 10s. 0d.

Lead (Refined Pig).—Second half August, £69 0s. 0d. to £69 5s. 0d.; second half November, £70 17s. 6d. to £71 0s. 0d.

Zinc.—Second half August, £63 5s 0d. to £63 10s. 0d.; second half November, £64 2s. 6d. to £64 5s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £98 5s. 0d.; rolled zinc (boiler plates), all English destinations, £96 0s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £87 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 7¾d. per lb.; sheets to 10 w.g., 175s. 9d. per cwt.; wire, 2s. 5d.; rolled metal, 175s. 9d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £139; B6 (85/15), —; BS249, —.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £165; HTB2 (38 tons), —; HTB5 (48 tons),—.

Gunmetal.—BS1400, LG2 (85/5/5/5), £170; LG3 (86/7/5/2), £179; G1 (88/10/2/½), £239; (88/10/2/1), £227.

Phosphor Bronze.—BS1400, PB1 (AID released), £256 per ton.

Phosphor Bronze Strip, etc.—Strip, 259s. 6d. per cwt.; wire, 3s. 8¾d. per lb.; rods, 3s. 0¾d.; tubes, 3s. 0¾d.; chill cast bars: solids 3s. 0¼d.; cored 3s. 1¼d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 7d. per lb.; round wire, 10g. in coils (10 per cent.), 3s. 11¾d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 3s. 10¾d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 5¼d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £79 0s. 0d. Nickel, £600 0s. 0d. Aluminium ingots, £180 0s. 0d.; aluminium bronze (BS1400), AB1, £207; AB2, —.

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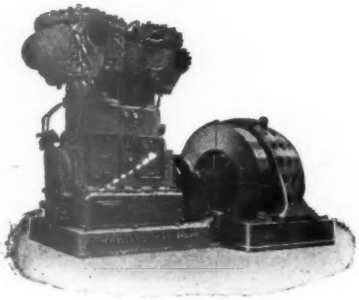

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Pig-iron and Steel Production

Statistical Summary of June Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table 1 summarizes activities during recent months. Table 2 gives production of steel ingots and castings in June. Table 3, weekly average production of finished steel in May. Table 4 gives the production of pig-iron and ferro-alloys in June, and furnaces in blast. (All figures are weekly averages in thousands of tons.)

TABLE 1.—*Iron and Steel Price Index and General Summary of Pig-iron and Steel Production.*

Period.	B.o.T. Price Index, 1938 = 100.			Iron-ore output.	Imported ore used.	Coke sent to blast-furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	Iron and steel.	Coal.	Basic materials excl. fuel[1]						Imports.[2]	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.[3]
1956	296	453	542	312	272	264	253	216	27	397	318	1,444
1957	328	488	537	325	303	270	275	220	14	417	322	1,444
1958—Mar. ..	341	511	482	285	305	258	268	233	13	432	329	1,567
April[4]	341	506	479	270	291	243	257	218	11	408	303	1,606
May ..	342	496	476	271	266	229	250	202	9	379	295	1,579
June ..	342	497	478	274	258	222	243	201	8	374	—	1,541

TABLE 2.—*Average Weekly Production of Steel Ingots and Castings in June*, 1958. (*Thousands of Tons.*)

District.	Open-hearth.		Bessemer.	Electric.	All other	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derbyshire, Leics., Notts., Northants and Essex	—	4.5	12.1 (basic)	1.8	0.1	17.2	1.3	18.5
Lancs. (excl. N.W. Coast), Denbigh., Flints. and Cheshire	2.0	34.0	—	2.5	0.3	37.6	1.2	38.8
Yorkshire (excl. N.E. Coast and Sheffield) ..								
Lincolnshire	—	41.1	—	—	0.1	41.1	0.1	41.2
North-East Coast	0.8	73.8	—	1.2	0.4	74.5	1.7	76.2
Scotland	2.3	38.3	—	2.4	0.1	40.8	2.3	43.1
Staffs., Shropshire, Worcs. and Warwicks ..	—	16.4	—	2.3	0.8	17.7	1.8	19.5
S. Wales and Monmouthshire	2.4	76.7	7.8 (basic)	0.7	0.1	87.2	0.5	87.7
Sheffield (incl. small quantity in Manchester) ..	8.4	22.6	—	10.4	0.4	40.0	1.8	41.8
North-West Coast	0.1	1.4	4.4 (acid)	0.6	0.1	6.6	0.2	6.8
Total	16.0	308.8	24.5	21.9	2.4	362.7	10.9	373.6
May, 1958	14.8	317.1	23.7	21.2	2.2	368.5	10.5	379.0
June, 1957	17.8	350.5	24.3	23.3	2.8	406.6	12.1	418.7

TABLE 3.—*Production of New Non-alloy and Alloy Finished Steel.*

Product.	1956.	1957.	1957.	1958.	
			May.[4]	April.[4]	May.
Ingots, blooms, billets and slabs[5]	4.7	5.0	5.7	5.1	4.8
Heavy rails ..	9.7	11.2	13.3	11.8	10.7
Sleepers	1.1	1.3	1.6	1.5	0.7
Fish- and soleplates	0.7	0.8	1.0	0.9	0.6
Plates:					
(i) ⅜ in. thick and over ..	30.3	34.0	37.5	33.5	34.8
(ii) Under ⅜ in. thick ..	19.9	20.3	21.4	18.6	18.9
Other heavy prod.	50.3	53.0	56.8	54.7	49.0
Ferro-concrete bars and rods ..	7.8	8.8	8.7	6.9	8.1
Wire rods	22.9	23.3	24.3	18.8	19.7
Arches, etc. ..	10.1	11.0	11.5	10.4	9.8
Other light sections	41.4	38.8	42.4	30.5	27.3
Bright steel bars ..	8.0	7.0	7.6	6.2	6.3
Hot-rolled strip ..	24.5	23.1	22.8	22.0	21.6
Cold-rolled strip ..	7.5	7.1	7.4	7.3	6.6
Sheets, incl. coated:					
(i) Hot rolled ..	15.0	13.0	12.9	11.5	10.1
(ii) Cold reduced	24.8	29.1	31.2	29.4	28.2
Tin and terneplate	15.9	18.8	22.2	19.6	19.2
Blackplate ..	1.3	1.0	0.9	0.9	0.7
Tubes under 16 in.	26.2	22.1	21.3	18.3	19.1
Tube, pipe fittings	0.5	0.5	0.5	0.3	0.3
Tyres, wheels axles	4.6	5.1	5.6	5.0	4.9
Forgings (excl. drop)	3.0	3.1	3.1	2.8	3.1
Steel castings ..	4.5	4.6	4.9	4.3	4.1
Tool steel ..	0.3	0.3	0.4	0.2	0.2
Total	335.0	342.3	365.0	320.5	308.8
Alloy steel	17.3	17.8	19.1	16.1	18.1
Total deliveries from UK production[6] ..	352.3	360.1	384.1	336.6	326.9
Add: Imported finished steel ..	19.5	9.6	5.4	7.2	8.4
Deduct: Intra-industry conversion[7] ..	371.8	369.7	389.5	343.8	335.3
	55.2	48.1	50.1	41.9	41.1
Total deliveries, new material	316.6	321.6	339.4	301.9	294.2

TABLE 4. —*Production of Pig-iron and Ferry-alloys during June*, 1958

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derbys, Leics., Notts., Northants, and Essex	21	2.6	17.5	18.8	0.6	—	39.5
Lancs (excluding N.W. Coast), Denbigh, Flints. and Cheshire ..	7	—	16.1	—	—	1.4	17.5
Yorkshire (excl. N.E. Coast and Sheffield) ..	—	—	—	—	—	—	—
Lincolnshire ..	10	—	39.5	—	—	—	39.5
North-East Coast	18	4.1	47.5	—	—	1.0	52.6
Scotland	7	0.6	17.6	1.4	—	—	19.6
Staffs., Shropshire Worcs., and Warwicks ..	5	—	8.2	1.7	—	—	9.9
S. Wales and Mon.	11	3.4	44.2	—	—	—	47.6
Sheffield	2	—	2.8	—	—	—	2.8
North-West Coast	7	13.0	—	0.1	—	1.1	14.2
Total ..	88	23.7	193.4	22.0	0.6	3 5	243.2
May, 1958 ..	90	23.9	195.0	26.0	0.2	4 5	249.6
June, 1957 ..	99	32.9	216.1	21.8	0.6	3.2	274.6

[1] Used in non-food manufacturing industries.
[2] Weekly average of calendar month.
[3] Stocks, mainly ingots and semi-finished, at the end of the year and months shown.
[4] Five weeks all tables.
[5] Other than for conversion into any other form of finished steel listed.
[6] Includes finished steel produced in the U.K. from imported ingots and semi-finished steel.
[7] Material for conversion into other products also listed in this table.